

INSTRUCTION MANUAL



SANGAMO WESTON

Schlumberger

MP MASTER



MA20093



INSTRUCTION MANUAL

EMR MODEL 4167
DUAL MODULAR
SUBCARRIER DISCRIMINATOR
(Revision B)

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SANGAMO WESTON

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EMR TELEMETRY



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NOTICE

IN THE EVENT THIS EQUIPMENT MUST BE RETURNED TO EMR FOR ANY REASON, SPECIAL CARE MUST BE EXERCISED IN PACKAGING FOR SHIPMENT. CARTON WITHIN A CARTON TYPE PACKING, WITH FOAM SUPPORT AND SEPARATORS IS RECOMMENDED TO PREVENT SHIPPING DAMAGE. SHOULD ANY INFORMATION BE REQUIRED REGARDING PACKAGING OF EMR EQUIPMENT, CONTACT EMR-TELEMETRY, SARASOTA, FLORIDA.

May, 1974

MANUAL CHANGE NOTICE #1

EFFECTIVITY: EMR Model 4167 serial numbers 1-32, 34-63, and 65-74.

DESCRIPTION: Resistor R16 on the Dual Discriminator Card is 3.57K for the earlier versions. This applies to both 1R16 and 2R16 on the card. The parts lists in Section 6 reflect this resistor value. Later versions of the card contain a 4.32K resistor in these locations. The card schematic diagram illustrates the 4.32K resistor. Part information for the 4.32K resistor is as follows:

R16 -- RESISTOR, 4.32K $\pm$ 1%, 1/10W, EMR No. 608-09-43200

May, 1974

MANUAL CHANGE NOTICE #2

EFFECTIVITY: EMR Model 4167R serial number 64 and up.

DESCRIPTION: The front-panel identification strips are changed such that only the reference frequency is included. This is identified in a single identification strip, the second strip is deleted.

May, 1974

MANUAL CHANGE NOTICE #3

EFFECTIVITY: Later versions of the Discriminator Cards.

DESCRIPTION: Integrated-circuit locations 1U2 and 2U2 are changed so that either of two types of integrated-circuit packages may be installed. Part information for the two integrated-circuit types is as follows:

1U2 or 2U2 -- Integrated-Circuit, Current Ampl., DC to
30 MHz, Vendor is Nat. Semi., Vendor
Part No's. are LH0002CH or LH0002CN.

Date of issue for basic is:

Basic December 1973
Revision A February 1975

Total number of pages in this manual is 86 consisting of the following:

Page No.	Rev. Letter
Title	A
A	Basic
i thru iv	Basic
1-1 thru 1-4	Basic
2-1 thru 2-8	Basic
3-1 thru 3-5	Basic
4-1 thru 4-7	Basic
4-8 and 4-9	A
4-10 thru 4-14	Basic
5-1 thru 5-11	Basic
5-12	A
5-13 and 5-14	Basic
5-15	A
6-1 thru 6-34	Basic

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
1	GENERAL DESCRIPTION	1-1
	1.1 Introduction	1-1
	1.2 Physical Description	1-1
	1.3 Functional Description	1-2
2	SPECIFICATIONS	2-1
	2.1 General	2-1
	2.2 Electrical Specifications	2-1
	2.3 Mechanical Specifications	2-2
	2.4 Environmental Specifications	2-3
	2.5 Model Number Identification	2-3
3	INSTALLATION AND OPERATION	3-1
	3.1 Installation	3-1
	3.2 Operation	3-1
	3.2.1 Operating Components	3-1
	3.2.2 Operating Adjustments	3-2
4	THEORY OF OPERATION	4-1
	4.1 General	4-1
	4.2 General Theory of Operation	4-1
	4.3 Detailed Theory of Operation	4-3
	4.3.1 Discriminator Card Circuits	4-3
	4.3.2 Channel Selector Card Circuits	4-6
	4.3.3 Low-Pass Filter Card Circuits	4-6
	4.3.4 Delay Line Card Circuits	4-7
5	MAINTENANCE	5-1
	5.1 General	5-1
	5.2 Routine Maintenance	5-1
	5.3 Troubleshooting	5-2
	5.3.1 Power Supply Check	5-2
	5.3.2 Circuit Waveforms	5-3
	5.4 Adjustments	5-3
	5.4.1 Symmetry Adjustment	5-4
	5.4.2 Bandedge Meter Zero Adjustment	5-4
	5.4.3 Bandedge Meter Sensitivity Adjustment	5-4
	5.5 Assembly Diagrams	5-4

TABLE OF CONTENTS (CONT'D.)

<u>SECTION</u>		<u>PAGE</u>
6	REPLACEABLE PARTS LIST AND RECOMMENDED SPARES LIST	6-1
6.1	General	6-1
6.2	Replaceable Parts Lists	6-1
6.3	Recommended Spares Lists	6-1
6.4	Provisioning Considerations	6-2
6.5	Ordering Instructions	6-2

LIST OF ILLUSTRATIONS

<u>FIGURE NO.</u>		<u>PAGE</u>
1-1	Typical System Configurations	1-3
3-1	EMR 4167 Rear Connector and External Connections . . .	3-3
3-2	EMR 4167 Front Panel Layouts	3-4
4-1	EMR 4167 Data Discriminator Block Diagram	4-2
4-2	FM Detector Waveforms	4-4
4-3	Discriminator Card Schematic Diagram	4-8
4-4	Channel Selector Card Schematic Diagram	4-10
4-5	Low-Pass Output Filter Card Schematic Diagram	4-11
4-6	Delay Line Card Schematic Diagram (Model 4167R)	4-12
4-7	EMR 4167 Data Discriminator Wiring Diagram	4-13
4-8	EMR 4167R Reference Discriminator Wiring Diagram . .	4-14
5-1	EMR 4167 Data Discriminator Top Assembly Diagram	5-8
5-2	EMR 4167R Reference Discriminator Top Assembly Diagram	5-9
5-3	Data Discriminator Subchassis Assembly Diagram	5-10
5-4	Reference Discriminator Subchassis Assembly Diagram	5-11
5-5	Discriminator Printed-Wiring Card Assembly Diagram	5-12
5-6	Channel Selector Printed-Wiring Card Assembly Diagram	5-13
5-7	Low-Pass Output Filter Printed-Wiring Card Assembly Diagram	5-14
5-8	Delay Line Printed-Wiring Card Assembly Diagram (Used Only in Reference Discriminator)	5-15

LIST OF TABLES

<u>TABLE NO.</u>		<u>PAGE</u>
2-1	IRIG Proportional-Bandwidth FM Telemetry Channels . .	2-6
2-2	IRIG and EMR Constant-Bandwidth FM Telemetry Channels	2-7
2-3	EMR 12-Channel Constant-Bandwidth Instrumentation Systems	2-8
3-1	EMR 4167 Front-Panel Components Description	3-5
5-1	EMR 4167 Circuit Waveforms	5-6
6-1	EMR 4167 Parts List	6-3
6-2	Model 4167-01 Top Assembly Parts List	6-4
6-3	Model 4167-02 Top Assembly Parts List	6-5
6-4	Model 4167R Top Assembly Parts List	6-6
6-5	Model 4167-01 Subchassis Assembly Parts List	6-7
6-6	Model 4167-02 Subchassis Assembly Parts List	6-8
6-7	Model 4167R Subchassis Assembly Parts List	6-9
6-8	Models 4167-01 and -02 Discriminator Cards Parts List	6-10
6-9	Model 4167R Discriminator Card Parts List	6-17
6-10	Channel Selector Card Parts List	6-21
6-11	Low-Pass Output Filter Card Parts List	6-22
6-12	Model 4167R Delay Line Card Parts List	6-23
6-13	EMR 4167-01 Recommended Spares	6-25
6-14	EMR 4167-02 Recommended Spares	6-27
6-15	EMR 4167R Recommended Spares	6-29
6-16	Vendor List	6-31
6-17	Multiple Manufacturers List	6-33
6-18	Customer Provisioning Questionnaire	6-34

SECTION 1

GENERAL DESCRIPTION

1.1 INTRODUCTION

This manual contains information describing the EMR Model 4167 Dual Modular Subcarrier Discriminator. Also discussed is the associated reference discriminator and delay line (EMR Model 4167R). Included in this manual is a physical and functional description, specifications, installation and operation, theory of operation, maintenance, and replaceable and spare parts lists.

1.2 PHYSICAL DESCRIPTION

The EMR 4167 is a modular unit designed for installation in an EMR 4005 Rack Adapter. A rack adapter is intended for mounting in a standard 19-inch wide equipment rack. Vertical height required for mounting the rack adapter is 5-1/4 inches.

The interior of a rack adapter is divided into 14 modular increments. A 4167 occupies one modular increment. However, an EMR 4024 Power Supply is normally installed in a rack adapter to supply operating power for the remaining rack adapter equipments. Since the power supply occupies four modular increments, up to ten 4167's may be included in a rack adapter with the power supply.

There are two basic configurations of a 4167, a dual channel data discriminator and a single channel reference discriminator. Top assembly diagrams for these units are shown in Figures 5-1 and 5-2. More detailed views of the internal equipments are shown in the chassis assembly diagrams, Figures 5-3 and 5-4. Each 4167 data discriminator (Figures 5-1 and 5-3) contains provisions for two completely separate and independent discriminators as determined by the installation of channel selector cards (item 3 in Figure 5-3) and low-pass filter cards (item 4 in Figure 5-4). Other than these two card sets, all data discriminators are identical. The channel selector card and low-pass filter card (items 3 and 4) in the rear of the unit are for discriminator #1. Corresponding cards in the front of the unit are for discriminator #2. When only one discriminator is included in a unit, the two cards for discriminator #2 are not supplied.

All data discriminator channel selector and low-pass filter cards plug into a main discriminator card (item 2 in Figure 5-3). The main card is identical for all data discriminator configurations and is divided into two identical sections. The rear half contains components for discriminator #1, while the front half contains components for discriminator #2.

The data discriminator front panel is also divided into two identical sections. Components on the left side of the front panel (as viewed from the front of the unit) are for discriminator #1, while corresponding components on the right side are for discriminator #2.

The reference discriminator (Figures 5-2 and 5-4) is configured similarly except that the discriminator components are located on the front of the main discriminator card. A plug-in channel selector card (item 3 in Figure 5-4) and a plug in low-pass filter card (item 4 in Figure 5-4) are installed on the main discriminator card in the same manner as the data discriminators. The multiplex delay line card is mounted on the rear of the main card. The reference discriminator front panel contains a single set of operating components for the discriminator circuits.

A connector (J1) mounted on the rear of each unit chassis (Figures 5-2 and 5-4) terminates all external electrical connections for the unit. This connector mates with a corresponding receptacle in the rack adapter interior, completing the electrical connections to external equipments.

1.3 FUNCTIONAL DESCRIPTION

The 4167 contains one or two data discriminators, each of which is designed to extract a subcarrier channel from an FM multiplex and to detect any data in the channel. Detected data is supplied at the unit output in the form of analog voltages which may then be used for further processing or display. Multiple discriminators, each tuned to operate at different subcarrier frequencies, may be connected in parallel to recover the data contained in a real-time or a pre-recorded FM multiplex. Typical real-time and playback system configurations are illustrated in Figure 1-1.

For real-time systems, the received FM multiplex is routed simultaneously to all data discriminators. In a playback system, the FM multiplex from a pre-recorded tape may contain errors incurred during the recording or playback of a tape. To detect and provide compensation for these errors, an EMR 4167R Reference Discriminator may be used in the system.

The 4167R extracts the reference frequency from the recorded multiplex and detects any modulation of the reference frequency. This resulting modulation is supplied at the 4167R output as a tape-speed-compensation (TSC) error signal. The TSC error signal is then routed in parallel to all data discriminators. Since there is a signal delay in the reference discriminator, a multiplex delay line is included. This delay line delays the FM multiplex an amount equal to the delay through the reference discriminator. Therefore, the TSC error signal and the FM multiplex are applied to the data discriminators time-coincident.

The 4167 data discriminators can be configured to operate at center frequencies from 300 Hz through 300 kHz and deviations equivalent to $\pm 2.5\%$ through $\pm 40\%$. Plug-in channel selector cards establish the subcarrier channel parameters. The deviation polarity is positive in that an increase of frequency at the input will result in an increase of voltage at the output. Plug-in low-pass filters establish the data cutoff frequency and the response characteristic. Cutoff frequencies from 5 Hz through 60 kHz may be selected with a constant amplitude or constant delay characteristic. Asymptotic rolloff beyond cutoff is 30 dB/octave.

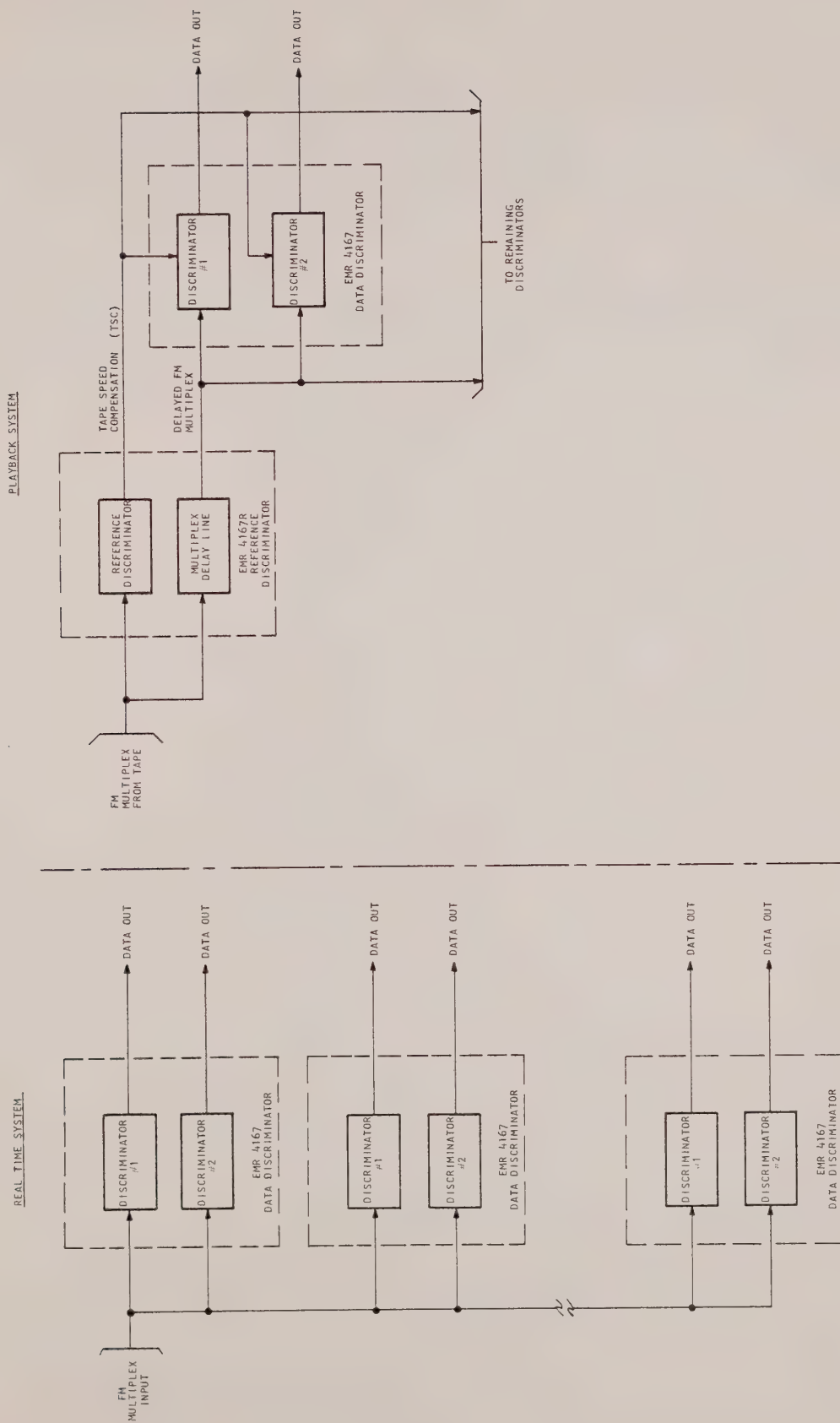


Figure 1-1. Typical System Configurations

Balance and bandedge volts controls are provided for each discriminator, as well as a deviation meter and IN/OUT test jacks. The balance control is used to set the unit output to zero with a center frequency input. The bandedge volts control is used to establish the maximum output voltage for full bandwidth deviation. The full-bandwidth output level is continuously adjustable from $\pm 0.1V$ through $\pm 10.5V$.

A reference discriminator is the same as a data discriminator except that the deviation parameter is $\pm 7.5\%$ for all reference channels. The low-pass filter is a special configuration designed to amplitude complement the bandpass filter in the reference discriminator.

SECTION 2

SPECIFICATIONS

2.1 GENERAL

This section contains the electrical, mechanical, and environmental specifications for the EMR 4167. Also provided is model number identification which may be used to identify the unit parameters and capabilities. The model number is stamped on the nameplate attached to the side of the unit. Tables 2-1, 2-2, and 2-3 contain tabular listings of the standard EMR and IRIG proportional bandwidth and constant bandwidth FM telemetry channels and standard systems.

2.2 ELECTRICAL SPECIFICATIONS

The electrical specifications apply to both discriminators in a dual unit. Also, the specifications apply specifically to standard $\pm 7.5\%$ deviation IRIG proportional bandwidth channels and a deviation ratio of 5.

- a. Center Frequencies: 300 Hz to 300 kHz.
- b. Deviations: $\pm 2.5\%$ to $\pm 40\%$ of center frequency.
- c. Deviation Polarity: Positive sense.
- d. Data Cutoff Frequencies: 5 Hz to 60 kHz.
- e. Input Impedance: Not less than 100 k Ω , shunted by less than 75 pF.
- f. Input Signal Range: 10 mV to 5V rms.
- g. Amplitude Modulation Rejection: A 20 dB step of input amplitude anywhere in the input range causes a peak transient no greater than 1% of full bandwidth.
- h. Tape-Speed Compensation: An improvement ratio of 26 dB for tape-speed variations up to $\pm 3\%$.
- i. Non-Linearity: Not greater than $\pm 0.05\%$ of full bandwidth, best straight line.
- j. RMS Output Noise: Not greater than 10 mV rms.
- k. Total Harmonic Distortion: Not more than 0.5%.

1. Output Zero Stability: The following specifications apply to a unit after a 30-minute warmup and apply only to units containing the original channel selector card.

1. Time -- Output drift is not greater than $\pm 0.05\%$ of center frequency plus $\pm 0.05\%$ of full bandwidth for 8 hours at a constant temperature.

2. Temperature: The temperature coefficient of zero drift is not more than $\pm 0.005\%$ of center frequency per $^{\circ}\text{F}$.

- m. Deviation Sensitivity Stability: The following specifications apply to a unit after a 30-minute warmup and apply only to units containing the original channel selector card.

1. Time -- Not more than 0.1% change in 8 hours at a constant temperature.

2. Temperature -- The temperature coefficient of change is not more than $\pm 0.03\%$ per $^{\circ}\text{F}$.

- n. Output Voltage: Continuously adjustable at a front-panel control from $\pm 0.1\text{V}$ to $\pm 10.5\text{V}$ for full bandwidth deviation.

o. Output Current: Up to 50 mA peak.

p. Loading: Any capacitive load up to $0.01\ \mu\text{F}$, provided the output current is not exceeded. Output cannot be damaged by a short circuit.

q. Data Response: Determined by the plug-in output filter. Output filters have either constant-amplitude or constant delay characteristics. Asymptotic rolloff beyond cutoff is 30 dB/octave.

r. Power Requirements: The 4167 operates directly from an EMR Model 4024 Power Supply. The power supply operates from various primary AC power sources and can drive up to 10 4167's (up to 20 channels). Power dissipation of a 4167 is less than 14 watts. Refer to the power supply instruction manual for detailed power requirements.

2.3 MECHANICAL SPECIFICATIONS

a. Panel Size: 5-1/4 inches (13.3 cm) high by one modular width (1-7/32 inches; 3.10 cm).

b. Overall Depth: 16-3/4 inches (42.5 cm), excluding front-panel projections.

- c. Weight: Net, 1 pound 6 ounces (624 gm). Shipping, 4 pounds (1.82 kg).
- d. Panel Finish: Gray (26492) semigloss baked enamel with black lettering is standard. Other paints and panel lettering combinations may be obtained on special order.
- e. Mounting: The 4167 mounts in an EMR Model 4005 Rack Adapter and occupies one modular width of the rack adapter interior. Therefore, a single rack adapter can house an EMR 4024 Power Supply (four modular widths) and ten 4167's (up to 20 channels).

2.4 ENVIRONMENTAL SPECIFICATIONS

- a. Temperature: Operating temperature is +10°C to +50°C. Storage temperature is -55°C to +85°C.
- b. Relative Humidity: 5% to 95%.
- c. Altitude: 0 to 10,000 feet.

2.5 MODEL NUMBER IDENTIFICATION

The 4167 contains a nameplate on the right side of the unit cover. This model number reflects all pertinent information for the unit as originally supplied by EMR. Digits of the model numbers for both a dual data discriminator and for the reference discriminator are described as follows:

a	b	c	d	e	f	g
XX	XXX.XXX	XXX.XX	()	XXXXX.X	()	XXX.XXX
4167 -						
h	i	j	k	l		
XXX.XX	()	XXXXX.X	()	X		
					Dual Modular Subcarrier	
<u>Discriminator</u>						

- a. Design Sequence --
 - 01: One discriminator
 - 02: Two discriminators
- b. Center frequency in 6-digit kHz.
- c. Deviation in 5-digit kHz for CBW channels or 5-digit % for PBW channels.

- d. K for CBW
% for PBW
- e. Cutoff frequency in 6-digit kHz.
- f. Output Filter Characteristic --
A: Constant amplitude
D: Constant delay
- g. Same as (b) except for discriminator #2.
- h. Same as (c) except for discriminator #2.
- i. Same as (d) except for discriminator #2.
- j. Same as (e) except for discriminator #2.
- k. Same as (f) except for discriminator #2.
- l. Panel Paint and Lettering --
4: Gray, 26492, with black lettering
9: Special

a
b
c

4167-R $\overbrace{X}^a$ - $\overbrace{XXX.XXX}^b$ - $\overbrace{X}^c$ Reference Discriminator

- a. Design Sequence --
1: Standard
- b. Reference frequency in 6-digit kHz.
- c. Panel Paint and Lettering --
4: Gray, 26492, with black lettering
9: Special

Channel selectors and low-pass filters have individual model numbers and may be obtained separately. These model numbers are as follows:

a
b
c
d

4167-B^aX^b-XXX.XXX^c-XXX.XX^d-() Channel Selector

- a. Design Sequence --
1: Standard
- b. Center frequency in 6-digit kHz.
- c. Deviation in 5-digit kHz for CBW or 5-digit % for PBW.
- d. K for CBW
 % for PBW

a
b
c

4167-C^aX^b-XXXXX.X^c-X Output Filter

- a. Design Sequence --
1: Standard
- b. Cutoff frequency in 6-digit Hz.
- c. Characteristic --
A: Constant amplitude
D: Constant delay

Table 2-1. IRIG Proportional-Bandwidth FM Telemetry Channels

IRIG Channel Number	Channel Center Freq. (Hz)	Deviation	Low Band Edge (Hz)	High Band Edge (Hz)	Data Cutoff Freq. (Hz)
1	400	$\pm 7.5\%$	370	430	6
2	560	$\pm 7.5\%$	518	602	8
3	730	$\pm 7.5\%$	675	735	11
4	960	$\pm 7.5\%$	888	1032	14
5	1300	$\pm 7.5\%$	1202	1398	20
6	1700	$\pm 7.5\%$	1572	1828	25
7	2300	$\pm 7.5\%$	2127	2473	35
8	3000	$\pm 7.5\%$	2775	3225	45
9	3900	$\pm 7.5\%$	3607	4193	59
10	5400	$\pm 7.5\%$	4995	5805	81
11	7350	$\pm 7.5\%$	6799	7901	110
12	10,500	$\pm 7.5\%$	9712	11,288	160
13	14,500	$\pm 7.5\%$	13,412	15,588	220
14	22,000	$\pm 7.5\%$	20,350	23,650	330
15	30,000	$\pm 7.5\%$	27,750	32,250	450
16	40,000	$\pm 7.5\%$	37,000	43,000	600
17	52,500	$\pm 7.5\%$	48,562	56,438	790
18	70,000	$\pm 7.5\%$	64,750	75,250	1050
19	93,000	$\pm 7.5\%$	86,025	99,975	1395
20	124,000	$\pm 7.5\%$	114,700	133,300	1860
21	165,000	$\pm 7.5\%$	152,625	177,375	2475
A	22,000	$\pm 15\%$	18,700	25,300	660
B	30,000	$\pm 15\%$	25,500	34,500	900
C	40,000	$\pm 15\%$	34,000	46,000	1200
D	52,500	$\pm 15\%$	44,625	60,375	1600
E	70,000	$\pm 15\%$	59,500	80,500	2100
F	93,000	$\pm 15\%$	79,050	106,950	2790
G	124,000	$\pm 15\%$	105,400	142,600	3720
H	165,000	$\pm 15\%$	140,250	189,750	4950

Table 2-2. IRIG and EMR Constant-Bandwidth FM Telemetry Channels

±1-KHz Deviation		±2-KHz Deviation		±4-KHz Deviation		±8-KHz Deviation	
EMR Ch. No.	Center Freq.(KHz)	IRIG Ch. No.	Center Freq.(KHz)	IRIG Ch. No.	Center Freq.(KHz)	IRIG Ch. No.	Center Freq.(KHz)
1	8						
2	12						
3	16	1A	16				
4	20						
5	24	2A	24				
6	28						
7	32	3A	32	3B	32		
8	36						
9	40	4A	40				
10	44						
11	48	5A	48	5B	48		
12	52						
13	56	6A	56				
14	60						
15	64	7A	64	7B	64	7C	64
16	68						
17	72	8A	72				
18	76						
19	80	9A	80	9B	80		
20	84						
21	88	10A	88				
		11A	96	11B	96	11C	96
		12A	104				
		13A	112	13B	112		
Ref.	120	14A	120				
		15A	128	15B	128	15C	128
		16A	136				
		17A	144	17B	144		
		18A	152				
		19A	160	19B	160	19C	160
		20A	168				
		21A	176	21B	176		
				23B*	192	23C*	192
		Ref.	240	Ref.	240	Ref.	240

*Not IRIG-standard

Table 2-3. EMR 12-Channel Constant-Bandwidth Instrumentation Systems

EMR Channel Number	Subcarrier Frequency Deviation (KHz)					
	± 1	± 2	± 4	± 8	± 16	± 32
	Subcarrier Center Frequency (KHz)					
1	8	16	32	64	128	256
2	12	24	48	96	192	384
3	16	32	64	128	256	512*
4	20	40	80	160	320	640
5	24	48	96	192	384	768*
6	28	56	112	224	448	896
7	32	64	128	256	512	1024*
8	36	72	144	288	576	1152
9	40	80	160	320	640	1280*
10	44	88	176	352	704	1408
11	48	96	192	384	768	1536*
12	52	104	208	416	832	1664
Ref.	60	120	240	480	960	1920
*These frequencies, plus a 1792-KHz reference signal, can be used in a five-channel, ± 64 -KHz-deviation system.						

SECTION 3

INSTALLATION AND OPERATION

3.1 INSTALLATION

The EMR 4167 is shipped completely assembled and is ready for mounting. The unit should be inspected immediately on its arrival and notice given to EMR-Telemetry of any claim that the product does not conform with the terms of the order.

The 4167 is a modular unit designed for mounting in an EMR Model 4005 Rack Adapter. The modular unit is positioned on T-rails on the bottom surface of the rack adapter interior and is inserted into the mounting location. A push-to-lock knob on the front panel is depressed securing the unit in the mounting location of the rack adapter. The unit rear connector J1 mates with a corresponding receptacle in the rack adapter interior completing the electrical connections.

Information illustrating the position of the 4167's in the rack adapter is contained in the EMR Model 4005 Rack Adapter Instruction Manual supplied with the equipment. The 4167 rear connector J1 and the external connections terminated at J1 are illustrated in Figure 3-1.

Circulating air for cooling of the 4167's in the rack adapter is provided by a blower mounted vertically on the rack adapter rear panel.

3.2 OPERATION

3.2.1 Operating Components

All operating components are shown and identified in Figure 3-2. Front panels of both the 4167 (dual data discriminator) and the 4167R (reference discriminator) are shown. Each type of front-panel component is listed and described in Table 3-1. The dual data discriminator front-panel components are divided into two completely separate and independent groups. Components on the left side (as viewed from the front) of the front panel are for discriminator #1. Conversely, components on the right side are for discriminator #2. The only common component is the front-panel GND test jack. Functionally, the components for each data discriminator and components for the reference discriminator perform the same operation. Therefore, only one of each component type is discussed in Table 3-1.

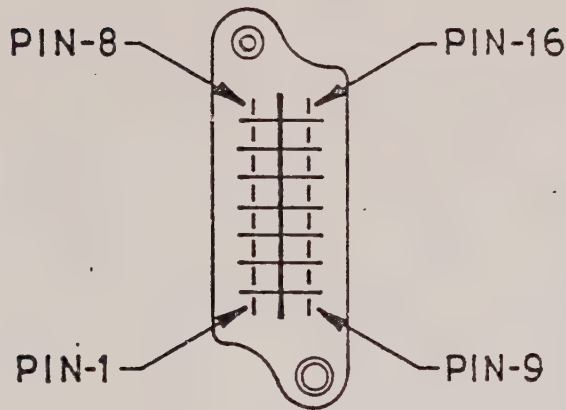
A front-panel tab identifies the operating parameters for the discriminators. For data discriminators, the center frequency, deviation, output filter cutoff frequency, and output filter response characteristic are identified. For reference discriminators, the reference frequency and the delay characteristics of the multiplex delay line are identified on the front-panel tab.

3.2.2 Operating Adjustments

The data discriminators operating adjustments consist of a balance setting and a bandedge volts setting. To perform these two adjustments, a precision frequency source should be connected to the multiplex input and a DC voltmeter should be connected to the data output. A balance adjustment is performed by supplying a center frequency input (1V rms) to the unit and adjusting the appropriate front-panel BAL control to obtain a 0V output. A bandedge volts adjustment is performed similarly by supplying a bandedge frequency input (1V rms) to the unit and adjusting the appropriate front-panel BEV control to obtain the desired bandedge volts. The bandedge output level may be set to any value from 0.1V to 10.5V peak.

The reference discriminator operating adjustments are performed in an identical manner as the data discriminators. However, the unit bandedge volts adjustment should be performed using a CF +3% input. The front-panel BEV control should then be set to obtain a $+4V \pm 2 \text{ mV}$ output level.

Connector J1 Layout



PIN	4167A	4167R
1	+18V Input	+18V Input
2	-18V Input	-18V Input
3	Signal Ground	Signal Ground
4	TSC #1 Input	- - -
5	TSC #2 Input	- - -
6	Signal Ground	Signal Ground
7	Disc #2 Output	Ref. Disc Output (TSC Out)
8	Switch Output to Meter	Switch Output to Meter
9	Chassis Ground	Chassis Ground
10	- - -	- - -
11	- - -	- - -
12	Disc #1 Input	Multiplex Input to Delay Line
13	Signal Ground	Signal Ground
14	Signal Ground	Signal Ground
15	Disc #2 Input	Ref. Disc Input
16	Disc #1 Output	Multiplex Output from Delay Line

Figure 3-1. EMR 4167 Rear Connector and External Connections

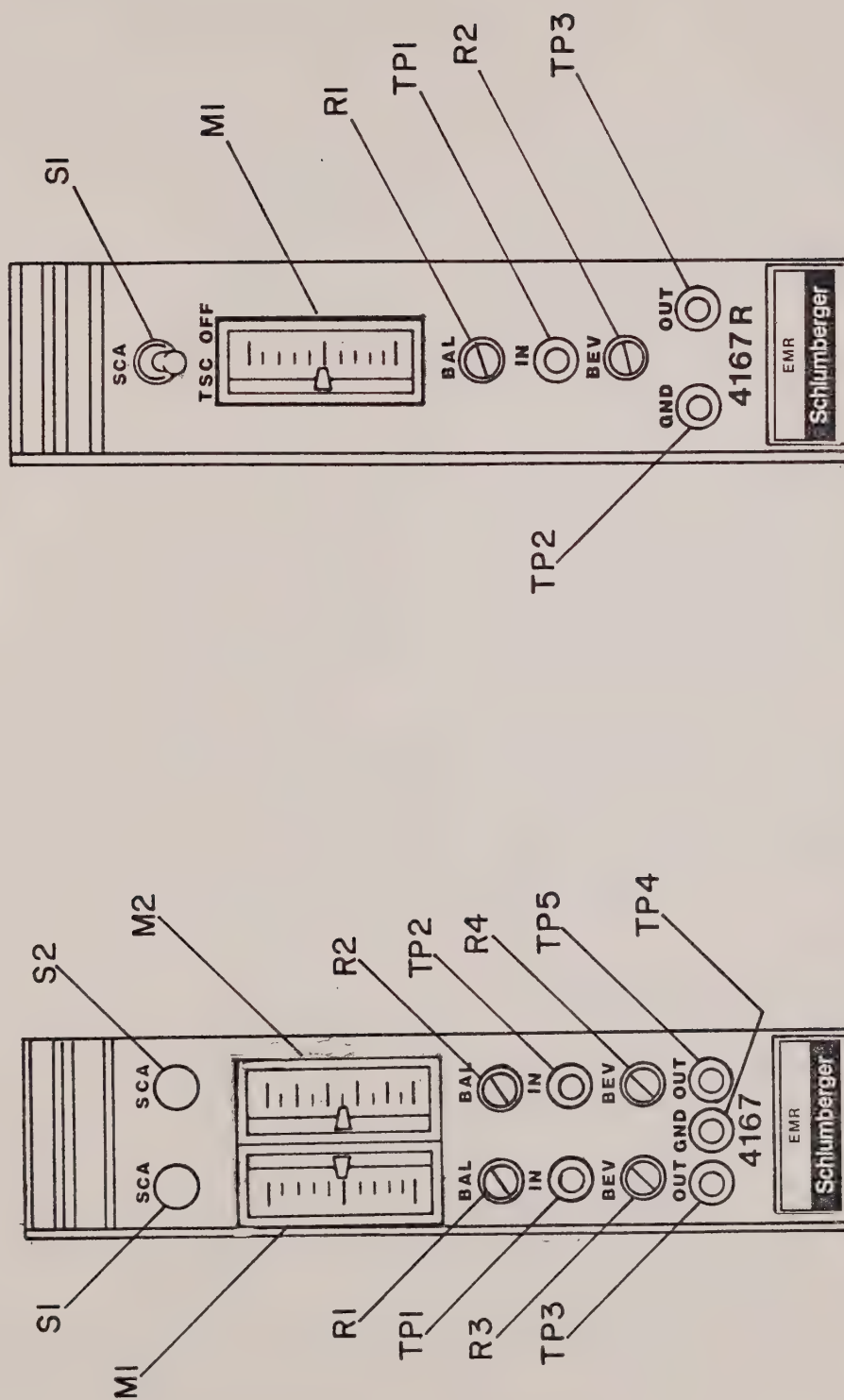


Figure 3-2. EMR 4167 Front Panel Layouts

Table 3-1. EMR 4167 Front-Panel Components Description
(Ref. Figure 3-2)

NAME	TYPE	FUNCTION
SCA Switch	Momentary Pushbutton Switch (or Toggle Switch)	When depressed, the subcarrier signal from the bandpass input filter output is routed to a front-panel amplitude meter on the associated EMR 4024 Power Supply. A single meter can, therefore, be used to display the amplitude of the subcarrier signal from any discriminator in a system. On a reference discriminator (4167R), this switch is used also as the TSC ON/OFF control. In this application, the switch is a center TSC ON and down TSC OFF toggle switch. The up position is a momentary selection used to display the reference frequency level on the power supply (the TSC remains on when the switch is in the up position).
Deviation Meter	- - -	This meter displays the amount of deviation occurring in the subcarrier channel. Center scale is 0 which corresponds to center frequency. Meter extremes (up and down) are identified as H (high bandedge) and L (low bandedge).
BAL Control	Potentiometer	Used to set the discriminator output voltage with a center frequency input.
IN Test Jack	- - -	Subcarrier signal monitor at the bandpass filter output.
BEV Control	Potentiometer	Used to set the discriminator output voltage with a bandedge frequency input.
OUT Test Jack	- - -	Data output monitor.
GND Test Jack	- - -	Ground.

SECTION 4

THEORY OF OPERATION

4.1 GENERAL

This section contains the general and detailed theory of operation for the EMR 4167. An overall functional description of the 4167 and typical system configurations descriptions are provided in Section 1 of this manual. The general theory of operation is provided in paragraph 4.2 with reference to the overall block diagram. The detailed theory discussion is provided in paragraph 4.3 with reference to the unit schematic and wiring diagrams. Remaining diagrams are provided in Section 5 of this manual.

4.2 GENERAL THEORY OF OPERATION

Primary circuits of each data discriminator in the 4167 are shown in the simplified block diagram, Figure 4-1. This block diagram also illustrates the circuits of a reference discriminator in a 4167R except that the TSC input is not used in a reference discriminator configuration.

The FM subcarrier multiplex input is routed from the unit input to an input buffer which supplies the FM multiplex to the bandpass input filter (BPIF). This filter is tuned to extract only the frequencies of a specific subcarrier channel from the FM multiplex. The subcarrier output of the BPIF is routed to a limiter circuit and to a front-panel SCA (subcarrier amplitude) switch. When the SCA switch is depressed, the subcarrier signal is coupled to the unit output for routing to a meter on the associated power supply.

The limiter circuit is a high-gain squaring circuit which converts the subcarrier signal into a square wave operating at the subcarrier rate. Zero crossings of the subcarrier signal are maintained, thus maintaining the modulation component of the subcarrier signal input. Both phases of the squared subcarrier signal are routed to the FM detector.

The FM detector is a pulse-averaging circuit which generates fixed-period pulses based on the subcarrier input. Spacing between the pulses is dependent on the zero crossings of the subcarrier signal. Therefore, the deviation is expressed as the average power in the pulse train. A current switch is operated at the FM detector output which converts the voltage pulses into current pulses. The front-panel BAL (balance) control operates in conjunction with the current switch to adjust the current with a center frequency input, thus balancing the FM detector.

A five-pole low-pass filter (LPOF) is supplied in data discriminators, while a three-pole LPOF is included in a reference discriminator. The LPOF is tuned for a particular cutoff frequency and response characteristic. The filtered output of the LPOF is routed to the front-panel deviation meter and to the

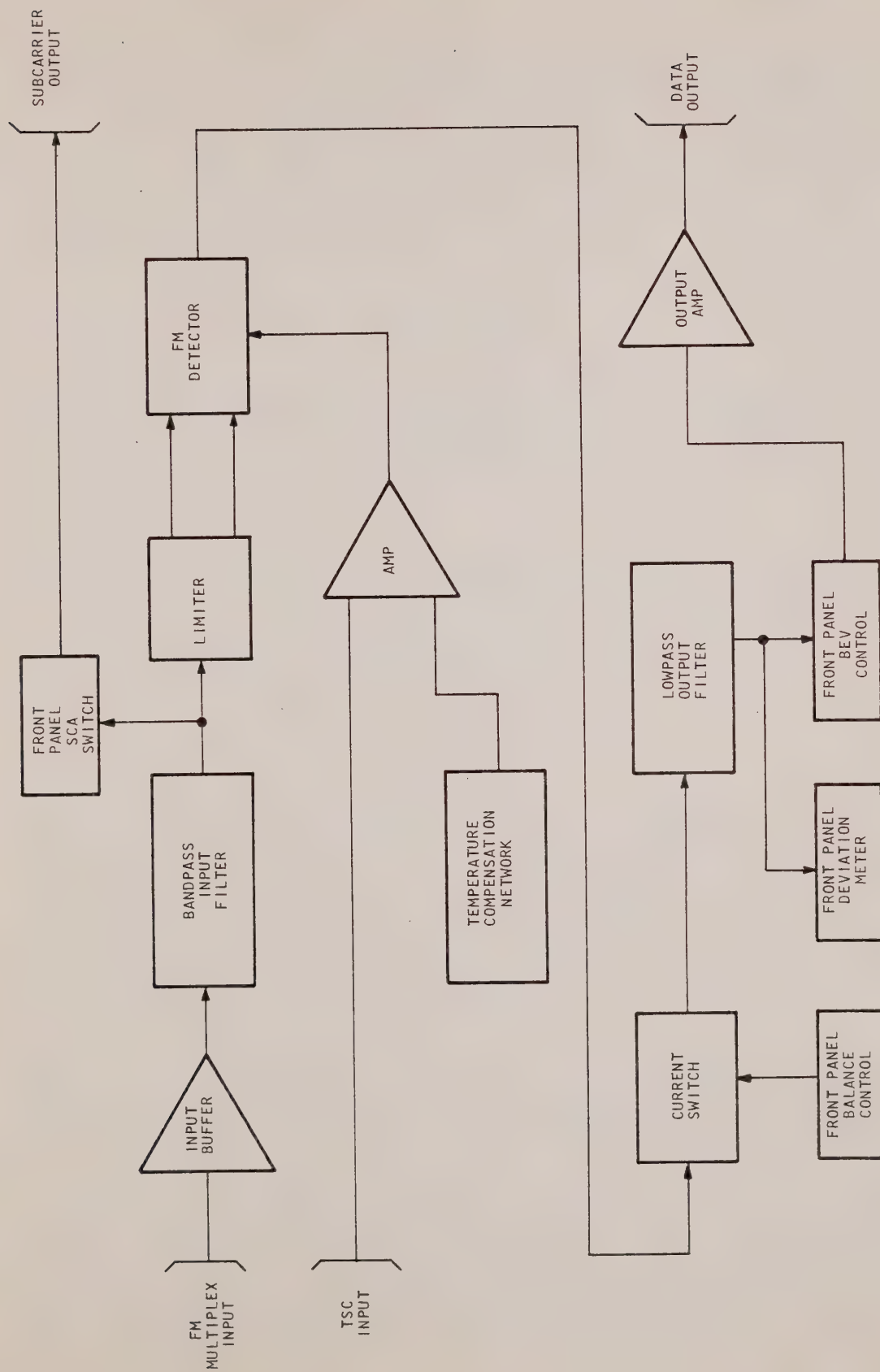


Figure 4-1. EMR 4167 Data Discriminator Block Diagram

front-panel BEV control. The meter displays the amount and direction of the deviation within the subcarrier channel. The output amplifier buffers the signal set at the BEV control and supplies the resulting signal to the unit data output.

The TSC and temperature compensation functions are combined in one network. TSC errors or errors resulting from temperature variations are thus removed or minimized by supplying proper compensation to the FM detector via this network.

4.3 DETAILED THEORY OF OPERATION

The detailed theory of operation is discussed with reference to the timing, schematic, and wiring diagrams in Figures 4-2 through 4-8. The discriminator card schematic diagram (Figure 4-3) illustrates the circuits for one discriminator. This schematic can, therefore, be used for either data discriminator in a 4167 data discriminator or for the reference discriminator in a 4167R reference discriminator.

The channel selector card schematic diagram (Figure 4-4) and the low-pass output filter card schematic diagram (Figure 4-5) may be used for any corresponding assembly in either a data discriminator or a reference discriminator. Figure 4-6 is the delay line card schematic diagram which applies to the delay line card installed only in a reference discriminator. Figures 4-7 and 4-8 are wiring diagrams for the two major 4167 equipments.

4.3.1 Discriminator Card Circuits (Ref. Figure 4-3)

The FM multiplex is routed via unit wiring to card terminal E1. A connection from E1 to jack J2 couples the FM multiplex to the channel selector card. Circuits on the channel selector are discussed in paragraph 4.3.2. The resulting subcarrier signal from the channel selector is routed back to the discriminator card via jack J5 and is supplied to the limiter circuit and to the front-panel SCA switch. When the SCA switch is depressed, the subcarrier signal is supplied at the unit output and is defined as the bandpass (BP) output. The signal may be routed via system wiring to an EMR 4024 Power Supply for display on the power supply meter.

The limiter circuit is a three-stage switching network which converts the subcarrier input to a square wave representation. Zero crossings of the subcarrier are maintained which maintains the modulation component of the subcarrier signal.

Transistor pair Q1A and B is the input stage connected in a differential configuration. Resistor R11 is a symmetry adjustment which is used to balance the current in both stages of Q1. The Q1B collector signal is coupled through two follower transistors Q2 and Q3 and through inverter Q4 to an output switching network consisting of transistors Q5-Q10. Diodes CR4 and CR5 limit the voltage swing at the Q5 input to approximately ± 0.7 volt. The switching network

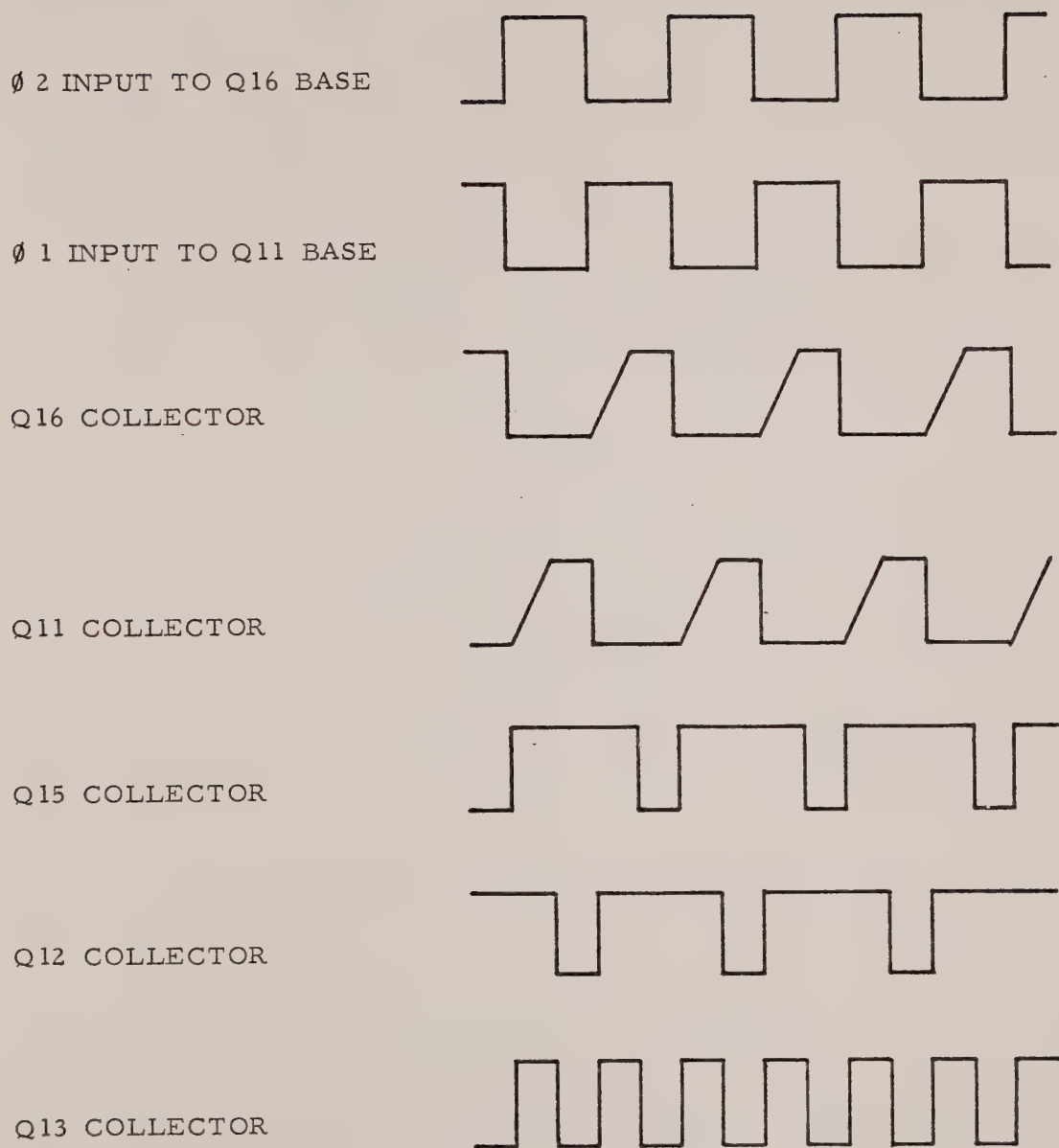


Figure 4-2. FM Detector Waveforms

(Q5-Q10) is a high-gain circuit which provides two square-wave outputs, 180° out-of-phase, representative of the subcarrier input. The outputs, identified as Ø 1 out and Ø 2 out, are coupled directly to the FM detector inputs.

The FM detector is a timing circuit which consists of two quarter-wave detectors, each operating from a Ø input. Transistors Q11 and Q16 are switching transistors operated by the Ø 1 and Ø 2 inputs. A timing diagram illustrating typical signals within the timing circuit is shown in Figure 4-2.

The Ø 2 input saturates Q16 during the positive half-cycle and capacitor C14 on the channel selector card is shorted. After termination of the positive half-cycle, Q16 is turned off and C14 starts charging toward the source voltage. As the charge increases to a specific level, Q15 is turned on and the C14 charge is terminated. Q15 remains on until the next positive half-cycle in which Q16 is again saturated and Q15 is turned off. Thus, Q15 is off until C14 charges (during the negative half-cycle) to a sufficient level again.

As a result, the period between positive half-cycles varies with the subcarrier rate but the charge time of C14 does not vary. The waveforms in Figure 4-2 illustrate the transistor switching and capacitor charging. The Ø 1 input to Q11 results in an identical switching operation with Q12. Both the Q12 and Q15 collectors are wire-OR'ed at the Q13 base which results in producing OR'ed pulses at the Q13 collector. Pulses at the Q13 collector at center frequency will have similar pulse durations; but at bandedge frequencies, the negative pulse durations will vary. As the subcarrier frequency increases, the negative pulse duration is shorter than the positive pulse duration. Conversely, as the subcarrier frequency decreases, the negative pulse duration is longer than the positive pulse duration.

Tuning of the two quarter-wave detectors is performed by fixed value capacitors (C12 and C14) installed on the channel selector card. These capacitors are sized for the appropriate center frequency as set by the channel selector card.

A current switch (Q17 and Q18) is operated at the timing circuit output which converts the voltage pulses to current pulses. Constant current source Q19/Q20 operates in conjunction with the front-panel BAL control to supply current for the current switch. The current switch output is routed directly to the LPOF which removes all high frequency components from the detected signal leaving only the modulation component.

A five-pole LPOF is included in a data discriminator, while a three-pole LPOF is included in a reference discriminator. Passive components which vary depending upon the LPOF cutoff frequency and response characteristic are installed on the LPOF card. Remaining components which do not vary and the active stages (U4-U6) of the LPOF are installed on the discriminator card.

The LPOF output is connected directly across the front-panel BEV control and is also routed via potentiometer R46 to the front-panel deviation meter.

The output amplifier is a two-stage network consisting of integrated circuits U2 and U3. Gain of the amplifier is set at approximately -10.2 by the ratio of feedback resistor R48 (10.2K) to input resistor R51 (1K). The amplifier output is set by the signal level selected at the front-panel BEV control. This output is coupled from the amplifier to a front-panel test jack and to a terminal of rear connector J1.

Integrated-circuit amplifier U1 supplies a DC source voltage to the FM detector. Changing or modulating this voltage level results in corresponding changes at the detector output. A diode bridge is connected to one input of the U1 amplifier. As temperature variations occur, the U1 output is changed by the diode bridge such that normal component reactions to the temperature changes are cancelled.

The same principle is used for the TSC function. Any errors incurred by the recording or playback of a tape are reflected in the data channels and the reference channel. As the reference discriminator detects the tape-speed errors in the reference channel, a TSC signal is supplied to one input of U1. The U1 output is thus modulated by the TSC signal resulting in changes in the FM detector. Changes in the FM detector are in opposition to the tape-speed errors, thus cancelling most effects of the tape-speed errors.

4.3.2 Channel Selector Card Circuits (Ref. Figure 4-4)

The channel selector card contains an input buffer, a BPIF, and timing components associated with circuits on the discriminator card. The FM multiplex input to the discriminator is connected via card terminal P2 through the cascaded follower (Q1 and Q2) to the BPIF. The BPIF is configured to extract only the frequencies of a subcarrier channel; all other frequencies are rejected. The resulting subcarrier signal is coupled through card terminal P5 back to the discriminator card. All discriminator card circuits and operations are discussed in paragraph 4.3.1.

4.3.3 Low-Pass Filter Card Circuits (Ref. Figure 4-5)

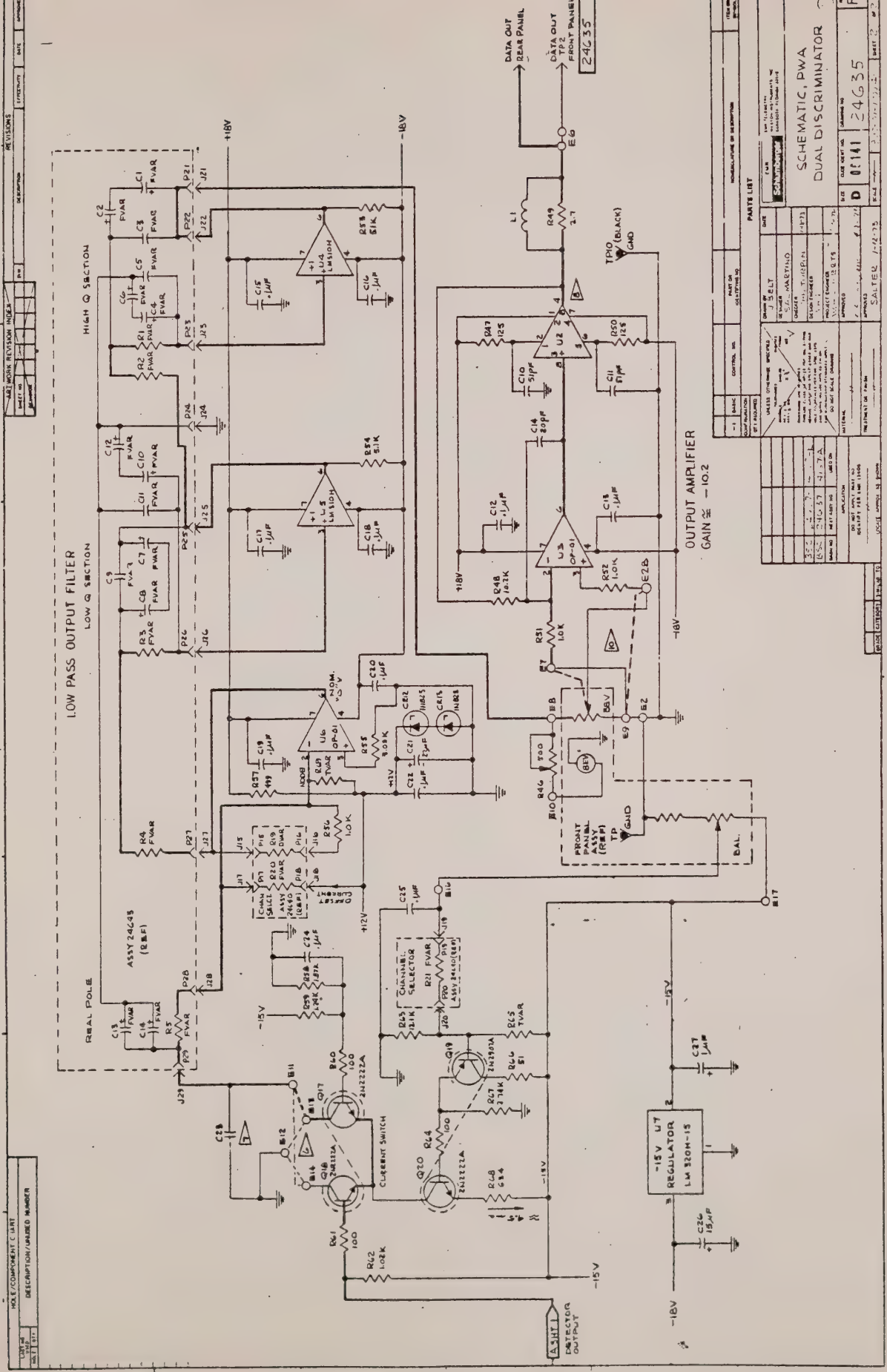
The low-pass filter card contains passive components which are used to establish the cutoff frequency and response characteristic of the LPOF. These passive components are connected with the active stages on the discriminator card to properly configure the LPOF. Data discriminators contain a five-pole filter, while reference discriminators contain a three-pole filter. The circuit configuration change between these two filters is defined in the NOTES of Figure 4-5.

The data discriminator LPOF has an asymptotic rolloff of 30 dB/octave beyond the cutoff frequency. Response of the LPOF is either constant amplitude (CA) or constant delay (CD). The reference discriminator LPOF is designed specifically to amplitude complement the BPIF so that the total response of the discriminator is constant through the reference channel.

4.3.4 Delay Line Card Circuits (Ref. Figure 4-6)

This card is installed on the discriminator card in a reference discriminator only. Included on the card is an input buffer (Q1/Q2), a series delay network, and an output buffer (Q3/Q4). The FM multiplex is first coupled to card terminal P2 from the discriminator card. Components of the delay line are variable and are established by the amount of delay required for the FM multiplex. This delay is a function of the delay through the reference discriminator. The delay is set such that the FM multiplex and the TSC signal at the reference discriminator outputs are time-coincident.

The delayed FM multiplex from the signal delay components is coupled through the output buffer to card terminal P29. This terminal routes the signal to the discriminator card terminal E11 which is then connected to the unit output at the rear connector J1.





- C7, C9 AND C10 ARE USED FOR FREQUENCIES 7.5 MHz THRU 75 MHz.
C7, C9 AND C10 ARE SHORTED FOR FREQUENCIES FROM 75 MHz THRU 120 KHz.
N2'S IN CIRCLES AROUND INDUCTORS ARE ALTERNATE PIN N2'S.

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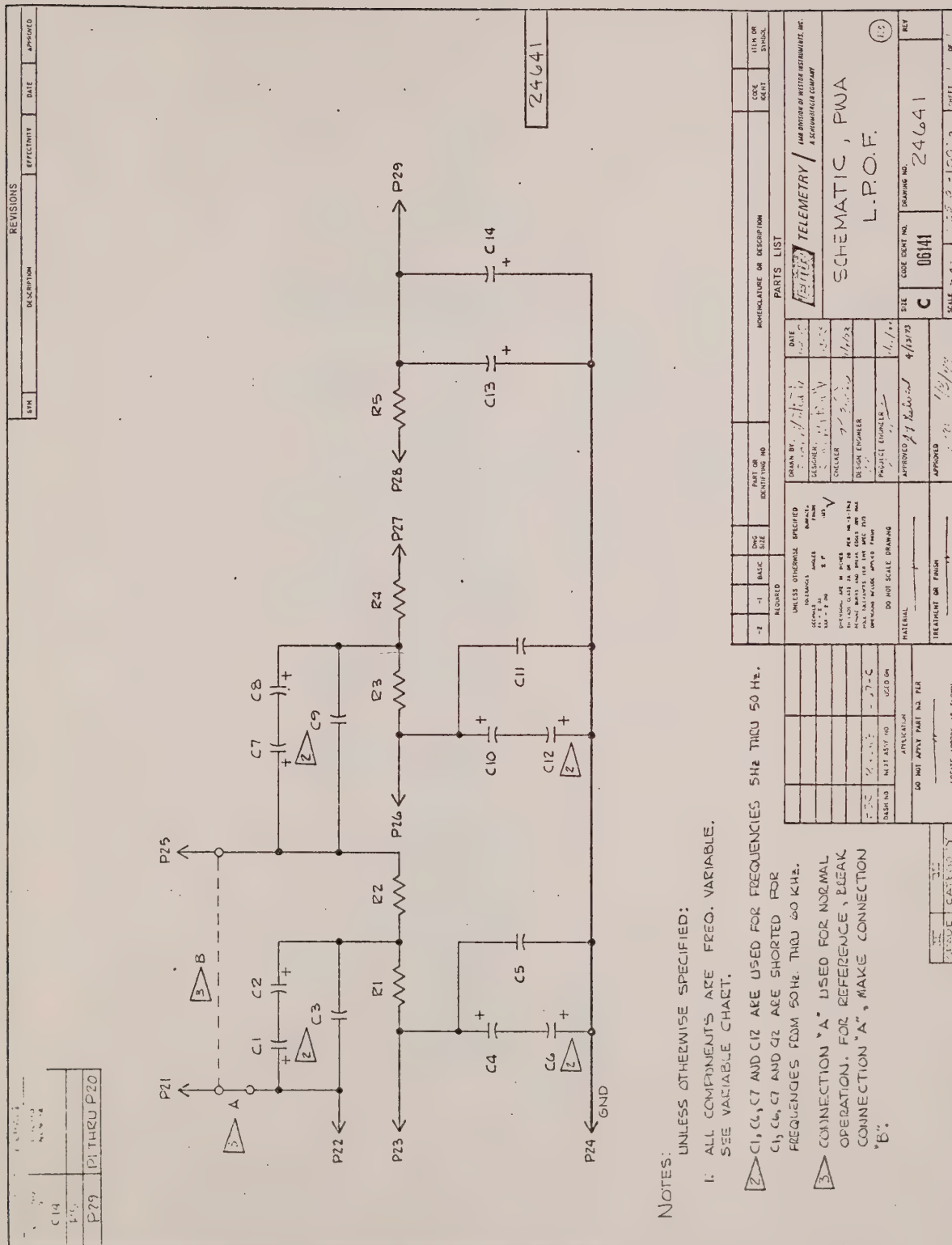


Figure 4-5. Low-Pass Output Filter Card Schematic Diagram





SECTION 5

MAINTENANCE

5.1 GENERAL

This section contains general and detailed maintenance information for the EMR 4167. Included in this information is a routine maintenance guide (paragraph 5.2), troubleshooting procedures (paragraph 5.3), and adjustment procedures (paragraph 5.4). The mechanical assembly diagrams are discussed in paragraph 5.5 and are shown in Figures 5-1 through 5-8. All electrical diagrams (block, schematic, and wiring) are supplied in Section 4 along with the theory of operation.

5.2 ROUTINE MAINTENANCE

The EMR 4167 routine maintenance consists of a periodic inspection of the unit and associated equipments (rack adapter, power supply, etc.). An inspection should be performed periodically to locate potential problems or, if a malfunction occurs, to assist in isolating a trouble. The inspection schedule will vary depending on the equipment use and the environment and, therefore, should be established by maintenance personnel. Items which should be inspected are listed as follows:

- a. Inspect all rack adapter rear-panel connections, internal wiring, and internal mating receptacles for the modular equipments.
- b. Inspect all 4167 front-panel components for proper installation and operation.
- c. Inspect the 4167 rear connector and connector terminals.
- d. Remove the 4167 cover and inspect all printed-wiring cards. Check all cards components as well as the plug-jack connections between cards.
- e. Inspect all 4167 wiring for loose or broken connections.

As a normal routine, the discriminators balance and bandedge volts adjustments should be checked. Information describing these operations is provided in Section 3 of this manual. Also, the power supply output voltages should be checked occasionally. This is performed at the power supply by referring to the power supply instruction manual or to paragraph 5.3.1 of this manual.

5.3 TROUBLESHOOTING

The EMR 4167 is a precision solid-state unit designed for long component life. However, should a malfunction occur, transistor or integrated-circuit module replacement will repair a majority of troubles.

Prior to troubleshooting in the 4167 circuits, the operator should be thoroughly familiar with the type and function of all 4167 circuits as discussed in Section 4 of this manual. A detailed block diagram is provided with the circuit discussions to assist in understanding the circuits. Detailed schematic diagrams of all cards are also supplied in Section 4 along with the unit wiring diagrams. Mechanical assembly diagrams in this section (paragraph 5.5) should be used in conjunction with the schematic diagrams to assist in locating specific components.

Once familiar with the unit circuits and the circuit functions, the operator can systematically trace signal flow or measure voltage levels to isolate a specific malfunction. Further aids in checking the unit and isolating malfunctions are provided in paragraphs 5.3.1 and 5.3.2.

After a malfunctioning component(s) is located, refer to the parts list in Section 6 of this manual for replacement component information. Readjustment of the affected circuit may be required after repair, depending on the particular component(s) replacement. This is determined primarily by the circuit location and the function of the replaced component(s). All adjustment information is provided in paragraph 5.4.

5.3.1 Power Supply Check

Before troubleshooting any 4167 circuits, check the power supply/regulator for proper outputs. The following guide should be used to check the power supply.

- a. Remove the cover from the 4167 and extend the unit from the rack adapter using a test adapter (typically an EMR Model 4601-02).
- b. Using a DC voltmeter, monitor discriminator card terminals E18 and E20 for +18 and -18 volts $\pm$ 100 millivolts, respectively. Ripple shall be less than 10 millivolts peak-to-peak.
- c. If voltages are in error, troubleshoot the external power supply using the power supply instruction manual.
- d. Using a DC voltmeter, monitor discriminator card terminal E17. The level should be -15 volts $\pm$ 300 millivolts.
- e. If the voltage is in error, inspect the components and the card area around regulator integrated circuit U7. If no trouble can be located, circuit U7 should be replaced. Recheck the level after replacement of U7.

5.3.2 Circuit Waveforms

The circuit waveforms are designed to aid in isolating a malfunction to a functional circuit in the discriminator. These waveforms are shown in Table 5-1. Figure 4-1, detailed block diagram, should be used in conjunction with the discriminator waveform table since this diagram illustrates all functional circuits and prime signal flow in the unit.

The waveforms shown in Table 5-1 are typical for any discriminator configuration; however, when applying an input signal, the signal parameters must correspond to the parameters established by the plug-in units.

To check the waveforms, the following preliminary steps shall be taken:

- a. Remove the cover from the 4167 and extend the unit from the rack adapter using a test adapter (typically an EMR Model 4601-02).
- b. Obtain a subcarrier oscillator with operating parameters of the channel selector installed in the unit.
- c. Supply a ground level potential to the tape-speed compensation (TSC) input of the discriminator (data discriminator only).
- d. Apply a subcarrier signal to the 4167 input of 2 volts peak-to-peak at the center frequency of the subcarrier channel.

5.4 ADJUSTMENTS

This paragraph contains information describing all maintenance adjustments in the 4167. Most adjustments in the unit are operating adjustments which are discussed in Section 3 of this manual. Operating adjustments are performed at front-panel components, while maintenance adjustments are performed at components in the unit interior. To perform the maintenance adjustments, the cover must be removed from the unit enabling access to the internal assemblies. The unit must also be extended from the rack adapter using a test adapter (typically an EMR Model 4601-02). After the adjustments are complete, the unit should be re-assembled and re-installed appropriately.

There is no particular adjustment period requirements. The adjustments may be performed as desired to ensure continued accurate outputs. However, all adjustments are performed at EMR prior to shipment and normally no re-adjustment is required unless a malfunctioning component is replaced or after long operating periods.

Prior to performing the 4167 adjustments, the DC supply voltages from the associated EMR 4024 Power Supply should be checked for the proper output levels. Reference should be made to the EMR 4024 Power Supply Instruction Manual for the supply output requirements.

5.4.1 Symmetry Adjustment

Each discriminator circuit (data or reference) contains an identical limiter stage which contains a symmetry adjust potentiometer. The following adjustment procedure can, therefore, be used for adjustment of this function in any 4167.

- a. Using an external signal generator, supply a 10 mV rms signal to the 4167 input at the center frequency of the sub-carrier channel.
- b. Using an oscilloscope, monitor discriminator card test jack TP1.
- c. Switch the input level from the initial setting of 10 mV to 1V rms and observe the symmetry of the signal at TP1.
- d. Adjust discriminator card potentiometer R11 until the signal symmetry remains constant regardless of the input level.

5.4.2 Bandedge Meter Zero Adjustment

All front-panel deviation meters zero adjustment is performed as follows:

- a. After removing the unit cover, re-install the unit on the rack adapter T-rails and insert the unit just far enough to hold it in the normal operating plane.
- b. Using a non-metallic tool, adjust the meter zero adjust control to center the meter needle on the 0 position of the dial.

5.4.3 Bandedge Meter Sensitivity Adjustment

All front-panel deviation meters sensitivity adjustment is performed as follows:

- a. Using a signal generator, supply an upper bandedge signal of 2 volts peak-to-peak to the unit input.
- b. Adjust potentiometer R46 on the discriminator card to the point at which the meter needle indicates full scale (upper bandedge) on the meter dial.

5.5 ASSEMBLY DIAGRAMS

The assembly diagrams for the 4167 are provided in Figures 5-1 through 5-8. Figure 5-1 is the unit top assembly diagram, while remaining figures illustrate

subassemblies and cards of the unit. Components or items of an assembly are identified on the assembly diagrams by reference numbers in balloons or by reference designators adjacent the components. These reference numbers or designations correspond to identical numbers in the parts list tables of Section 6.

Table 5-1. EMR 4167 Circuit Waveforms

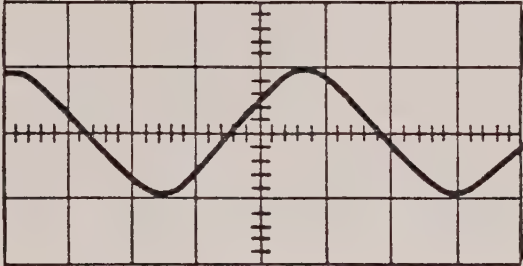
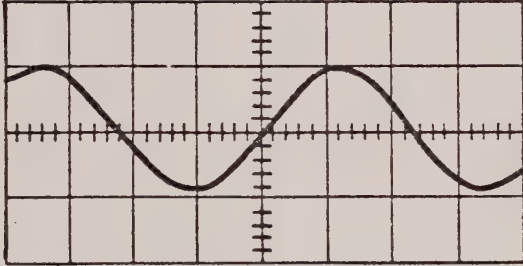
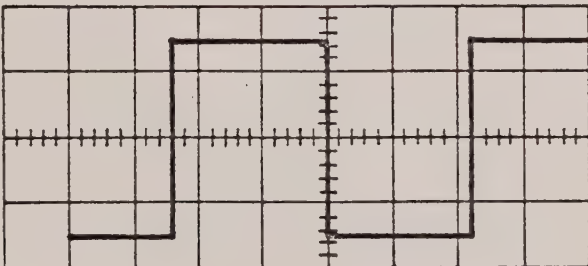
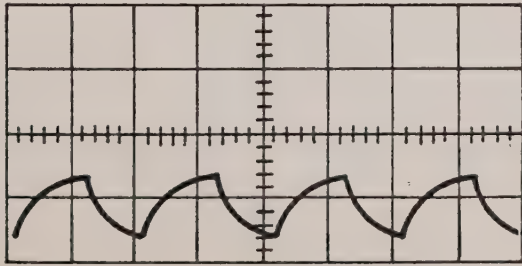
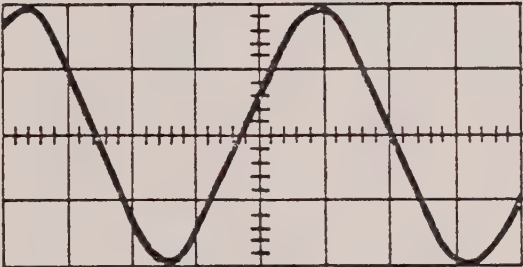
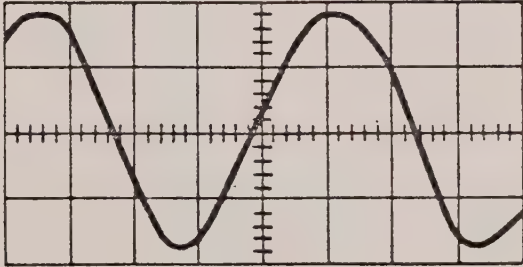
CIRCUIT LOCA- TION	INPUT	WAVEFORM	OSCILLOSCOPE	
			VERT.	HORIZ.
Center frequency subcar- rier input at rear connector J1 pin 12 or 15.	2 volts peak- to- peak	(1) 	1V/cm	---
Front- panel test jack TP1.	2 volts peak- to- peak	(2) 	1V/cm	---
Limiter output at TP1.	1.4 volts peak- to- peak	(3) 	.5V/cm -15	---
Current switch output at E11.	2 volts peak- to- peak	(4) 	5V/cm	---

Table 5-1 (Cont'd.). EMR 4167 Circuit Waveforms

CIRCUIT LOCA- TION	INPUT	WAVEFORM	OSCILLOSCOPE	
			VERT.	HORIZ.
		<u>NOTE</u> For the remaining waveforms, modulate the subcarrier signal input to the unit using a data signal of approximately 1/10 the cutoff frequency of the low-pass filter installed in the unit. The modulating data signal should deviate the subcarrier signal input from bandedge-to-bandedge.		
Low-pass output filter (LPOF) output at E8.	2 volts peak-to-peak with full-scale data modulation.	(5) 	.5V/cm	---
Data output at front-panel OUT test jack.	20 volts peak-to-peak with full-scale data modulation.	(6)  (Adjust front-panel B.E. VOLTS control to ascertain that an output amplitude of approximately 20 volts peak-to-peak can be obtained. This applies to data discriminators only. Reference discriminators can be adjusted such that the output is variable from 19V peak-to-peak to 21V peak-to-peak.)	5V/cm	---

ARTWORK REVIEW INDEX						RL #5087's			
	Syllable			SYN	DIVISION	EFFECTIVE	DATE	APPROVAL	
REVISION				✓	PROP CHNGS ADD = 1 - 4	7-21-79	1-11-80	✓	



40755:

Figure 5-1. EMR 4167 Data Discriminator Top Assembly Diagram

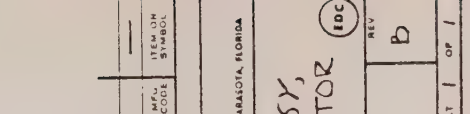
[illegible][illegible]

NOTES:

Figure 5-2. EMR 4167R Reference Discriminator Top Assembly Diagram

Figure 5-3. Data Discriminator Subchassis Assembly Diagram

ITEM IN SYMBOL	REV	OP /
FLORIDA	B	
ST, TOR		



UNLESS OTHERWISE SPECIFIED:

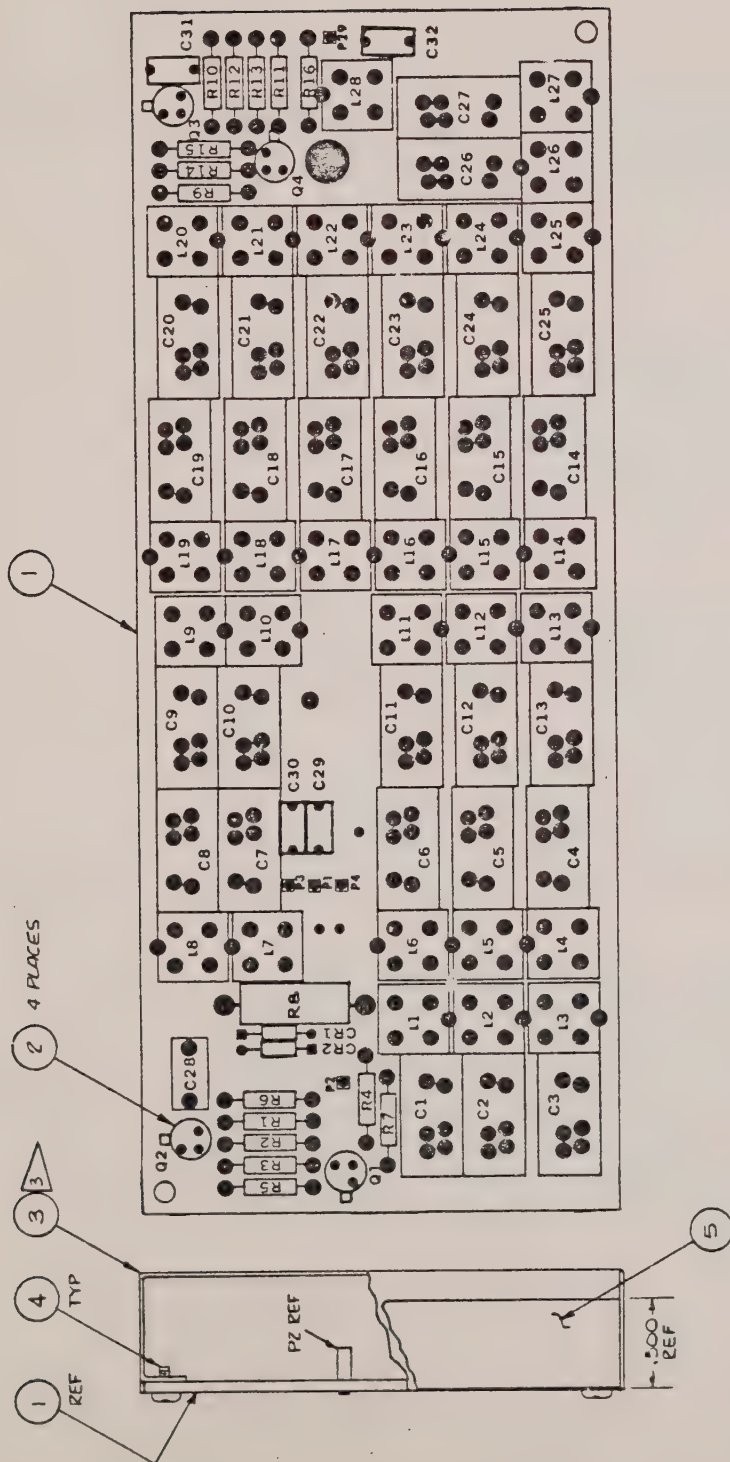
- SQUARE PAD INDICATES (+) POSITIVE END OF CAPACITORS, CATHODE END OF DIODES AND MECHANICAL ORIENTATION OF SYMMETRICAL MULTI-LEADED DEVICES.

4 → USE WITH Q1, Q2 & Q3.

WHEN C9 IS USED DRILL OUT PLATED-THRU HOLE

13.041 014
MOUNT ITEM 3 AFTER WAVE SOLDERING.

GRADE	CATEGORY	SIMILAR TO
II	II	—



NOTES:

- UNLESS OTHERWISE SPECIFIED:
1. MAX HEIGHT, COMPONENT SIDE .600, UNDER SHIELD,
NON-COMPONENT SIDE .032.
2. ■ SQUARE PAD INDICATES (+) POSITIVE END OF
CAPACITORS, CATHODE END OF DIODES AND MECHANICAL
ORIENTATION OF SYMMETRICAL MULTI-LEADED DEVICES.

3. INSTALL AFTER WAVE SOLDER.

[illegible]

Figure 5-8. Delay Line Printed-Wiring Card Assembly Diagram
(Used Only in Reference Discriminator)

SECTION 6

REPLACEABLE PARTS LIST AND RECOMMENDED SPARES LIST

6.1 GENERAL

This section contains information describing the replacement parts, recommended spares, spares provisioning, and ordering instructions for the EMR 4167. These items are discussed in separate major paragraphs of this section. Assembly diagrams to be used in conjunction with the parts lists are supplied in Section 5 of this manual.

6.2 REPLACEABLE PARTS LISTS

The replaceable parts lists for all assemblies of the 4167 are contained in Tables 6-1 through 6-12. Table 6-1 contains a master list of all major equipments in the 4167. The name of the 4167 assemblies is provided along with the major 4167 configurations, the table number in this section that contains the parts breakdown, the page number on which each parts list starts, and the figure number in this manual that illustrates the assembly.

The individual parts list tables are computer-prepared lists providing listings of all items and components on an assembly. These lists are keyed to the referenced assembly diagrams in Section 5 of this manual. Each item of the parts list is identified by an item number or component designation in the ITEM NO. column. The numbers or designations in this column correspond directly to the numbers in reference balloons on the associated assembly diagrams. The total quantity of an item or component on the assembly is listed in the QTY REQ'D column. The EMR NUMBER column contains the EMR-assigned 10-digit number of all items. Any replacement item for an assembly may be obtained directly from EMR using this part number.

The DRAWING OR SPEC NO. column contains an EMR assembly drawing or specification number under which the item or component is manufactured or purchased. A complete description and proper name of the item or component is provided in the DESCRIPTION column. The VENDOR NAME and VENDOR PART NUMBER columns contain the original manufacturer's name and part number of the item or component. Abbreviations are used in the VENDOR NAME column to identify the original manufacturer. A complete listing of all manufacturers and corresponding addresses is provided in Table 6-16.

6.3 RECOMMENDED SPARES LISTS

The recommended spares lists for the 4167 are contained in Tables 6-13 through 6-15. The recommended spares as listed in these tables are based on the following conditions:

- a. Operating Time -- 8 hours/day, 5 days/week (2080 hours/year).
- b. Operating Temperature -- 0°C to 50°C.
- c. User has capability to repair to the component level.
- d. Failure rates are constant.
- e. A 0.9 probability of being able to repair from the recommended complement for one year.
- f. Equipment will be used as ground equipment (as opposed to vehicular or airborne).

The recommended spares tables contain the same type of information for each item as the parts list tables. However, only the recommended spare items for each 4167 configuration are listed. The total quantity of each item used in the equipment is provided as well as the number of recommended spares. For a system containing several 4167's, the total number of spares may be adjusted as desired. That is, the total number of spares need not be calculated in a 1:1 ratio based on the number of units.

6.4 PROVISIONING CONSIDERATIONS

The selection of an optimum spare parts complement involves a number of considerations known only to the user. These considerations include operating time and cycles, operating environment, number of equipments to be spared and their locations with respect to one another, urgency of returning an equipment to service, troubleshooting, repair and test capability, stock of commonly used parts, etc.

Sparing considerations known to EMR include mean-time-between-failures for parts and assemblies under various operating environments, prices, relative ease of troubleshooting, repair, retest, etc.

Table 6-18 lists the type of information required in order for EMR to recommend an optimum spare parts complement for specific operating and logistic situations. If the information outlined in Table 6-18 is supplied to EMR, a recommended list will be furnished at no cost for each individual situation.

6.5 ORDERING INSTRUCTIONS

When ordering parts or assemblies from EMR, the complete description of the part or assembly must accompany the order. Also included must be the EMR number, the vendor name, and the vendor part number.

Table 6-1. EMR 4167 Parts List

ASSEMBLY NAME	4167-01			4167-02			4167R		
	TABLE NO.	PAGE NO.	FIGURE NO.	TABLE NO.	PAGE NO.	FIGURE NO.	TABLE NO.	PAGE NO.	FIGURE NO.
Top Assembly	6-2	6-4	5-1	6-3	6-5	5-1	6-4	6-6	5-2
Subchassis Assembly	6-5	6-7	5-3	6-6	6-8	5-3	6-7	6-9	5-4
Discriminator Card	6-8	6-10	5-5	6-8	6-10	5-5	6-9	6-17	5-5
Channel Selector Card	6-10	6-21	5-6	6-10	6-21	5-6	6-10	6-21	5-6
Low-Pass Output Filter Card	6-11	6-22	5-7	6-11	6-22	5-7	6-11	6-22	5-7
Delay Line Card	---	---	---	---	---	---	6-12	6-23	5-8

Table 6-2

E M R - T E L E M E T R Y									
PARTS LIST		24710-1		REV DATE 12/20/73		REV LTR A			
LIST TITLE		DSCRM, ASSY, SUBCARR, DUAL		CHGE CONT NO.		CODE IDENT		SHT 1 OF 1	
PART NO.		389-89-00070		ECO 48533		06141		CKD BY	
ITEM NO.	QTY REQD	E M R NUMBER		DRAWING OR SPEC NO.		DESCRIPTION		VENDOR NAME	
1	1	042-99-00139		25075		CHAS		EMR	
2	1	042-89-00203		24709-1		CHAS, SUB, ASSY		EMR	
3	1	191-89-00548		25221		PANEL, ASSY, FRONT		EMR	
4	1	075-89-00090		25076-1		COVER, ASSY		EMR	
5	AR	229-02-00183				SCREW, 4-40X1/8, FLT HD		PRCMT OPTION	
6	AR	229-02-00184				SCREW, 4-40X3/16, FLT HD		PRCMT OPTION	
7	AR	273-02-00025				WASHER, #4, INT TOOTH		PRCMT OPTION	
8	AR	287-02-00002				NUT, HEX, 4-40		PRCMT OPTION	
9	1	196-99-00156		10663		PLATE, NAME EQUIP IDENT		EMR	
10	4	412-99-00010		24928		IDENTIFIER		EMR	
11	AR	060-11-00001				CMPD, LOCKING, FINE THREAD		LOCITE CORP	
12	AR	229-02-00072				SCREW, 4-40X3/16, PAN HD		PRCMT OPTION	
REF 1	1	905-05-00368		25519		VAR CHART, MOD 4167-016-02		EMR	
REF 2	1	905-07-00240		23622		SPEC, ENGRG, MODEL 4167		EMR	
FIRST USAGE MODEL 4167-01									

Table 6-3

E M R - T E L E M E T R Y									
PARTS LIST		24710		REV DATE 12/20/73		REV LTR B			
LIST TITLE		DSCRM, ASSY, SURCARR, DUAL		CHGE CONT NO.		CODE IDENT		SHT 1 OF 1	
PART NO.		089-89-00368		ECO 48533		06141		CKD BY	
ITEM NO.	QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION		VENDOR NAME		VENDOR PART NUMBER	
1	1	042-99-00139	25075	CHAS		EMR		042-99-00139	
2	1	042-89-00187	24709	CHAS, SUB, ASSY		EMR		042-89-00187	
3	1	191-89-00548	25221	PANEL, ASSY, FRONT		EMR		191-89-00548	
4	1	075-89-00090	25076-1	COVER, ASSY		EMR		075-89-00090	
5	AR	229-02-00183		SCREW, 4-40X1/8, FLT HD		PRCMT OPTION		MS51959-11	
6	AR	229-02-00184		SCREW, 4-40X3/16, FLT HD		PRCMT OPTION		MS51959-12	
7	AR	273-02-00025		WASHER, #4, INT TOOTH		PRCMT OPTION		MS35333-70	
8	AR	287-02-00002		NUT, HEX, 4-40		PRCMT OPTION		MS35649-244	
9	1	196-99-00156	10663	PLATE, NAME EQUIP IDENT		EMR		196-99-00156	
10	4	412-99-00010	24928	IDENTIFIER		EMR		412-99-00010	
11	AR	060-11-00001		CMPD, LOCKING, FINE THREAD		LOCTITE CORP		LOCTITE GRADE A	
12	AP	229-02-00072		SCREW, 4-40X3/16 PAN HD		PRCMT OPTION		MS51957-12	
REF 1	1	905-05-00368	25519	VAR CHART, MOD 4167-01E-02		EMR		905-05-00368	
REF 2	1	905-07-00240	23622	SPEC, ENGRG, MODEL 4167		EMR		905-07-00240	
				FIRST USAGE MODEL		4167-02			

Table 6-4

E M R - T E L E M E T R Y									
PARTS LIST		25100		REV DATE 05/13/74		REV LTR A			
LIST TITLE		DSCRM, ASSY, REFERENCE		CHGE CONT NO.		CODE IDENT		SHT 1 OF 1	
PART NO.		089-89-00069		ECO 49270		06141		CKD BY	
ITEM NO.	QTY REQD	E M R NUMBER		DRAWING OR SPEC NO.		DESCRIPTION		VENDOR NAME	
1	1	042-99-00139		25075		CHAS		EMR	
2	1	042-89-00188		25224		CHAS, SUB, ASSY		EMR	
3	1	191-89-00544		25225		PANEL, ASSY, FRONT		EMR	
4	1	075-89-00083		25076		COVER, ASSY		EMR	
5	AR	229-02-00183				SCREW, 4-40X1/8, FLT HD		PRCMT OPTION	
6	AR	229-02-00184				SCREW, 4-40X3/16, FLT HD		PRCMT OPTION	
7	AR	273-02-00025				WASHER, #4, INT TOOTH		PRCMT OPTION	
8	AR	287-02-00002				NUT, HEX, 4-40		PRCMT OPTION	
9	1	196-99-00156		10663		PLATE, NAME EQUIP IDENT		EMR	
10	1	412-99-00006		15719		IDENT		EMR	
11	AR	060-11-00001				CMPD, LOCKING, FINE THREAD		LOCITE CORP	
12	AR	229-02-00072				SCREW, 4-40X3/16 PAN HD		PRCMT OPTION	
REF 1	1	905-05-00352		25226		VAR CHART		EMR	
REF 2	1	905-07-00240		23622		SPEC, ENGRG, MODEL 4167		EMR	
FIRST USAGE MODEL 4167-RX									
VENDOR PART NUMBER									
042-99-00139									
042-89-00188									
191-89-00544									
075-89-00083									
MS51959-11									
MS51959-12									
MS35333-70									
MS35649-244									
196-99-00156									
412-99-00006									
LOCUTE GRADE A									
MS51957-12									
905-05-00352									
905-07-00240									

Table 6-5

E M R - T E L E M E T R Y									
PARTS LIST		24709-1		REV DATE 03/14/75		REV LTR C			
LIST TITLE		CHAS, SUB, ASSY		CHGE CONT NO.		CODE IDENT		SHT 1 OF 1	
PART NO.		042-89-00203		ECO 51320		06141		CKD BY	
ITEM NO.	QTY REQD	E M R NUMBER		DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER		
1	1	042-89-00186		24708	CHAS, SUB, SUBASSY	EMR	042-89-00186		
2	1	205-89-01410		24637	PWA, DUAL DISCRIMINATOR	EMR	205-89-01410		
3	1	205-89-01411		24640	PWA, CHANNEL SELECTOR	EMR	205-89-01411		
4	1	205-89-01412		24643	PWA, LPOF	EMR	205-89-01412		
5	1	140-99-00226		30264	INSUL, 1.125X1.312 NOTCHED	EMR	140-99-00226		
6	2	140-99-00196		25289	INSUL, .30X1.4.60X.01 THK	EMR	140-99-00196		
8	AR	229-02-00072			SCREW, 4-40X3/16 PAN HD	PRCMT OPTION	MS51957-12		
9	AR	229-02-00075			SCREW, 4-40X3/8 PAN HD	PRCMT OPTION	MS51957-15		
10	AR	273-02-00025			WASHER, #4, INT TOOTH	PRCMT OPTION	MS35333-70		
11	AR	287-02-00002			NUT, HEX, 4-40	PRCMT OPTION	MS35649-244		
12	AR	229-02-00079			SCREW, 4-40X3/4 PAN HD	PRCMT OPTION	MS51957-19		
13	AR	070-98-00004			CORD, NYLON LACE, B FINISH	QVL/GUDEBROD	MIL-T-43435 / #20		
14	AR	276-98-00102			WIRE, #24, STRD, WHT, 600V	MML42	NAS-703-24-U-C-9		
15	AR	276-02-00048			WIRE, #24, SOL, WHT, 600V	PRCMT OPTION	MIL-W-16878/4#SIL CTD*		
16	AR	276-02-00020			WIRE, #24, STRD, 2COND, SHLD	PRCMT OPTION	MIL-W-16878/4#SIL CTD*		
17	AR	268-98-00001			TUBING, 1/4, THERMO-FIT, WHT	RAYCHEM	RNF-100		
18	AR	229-02-00231			SCREW, 4-40X1/4, 100FLT HD	QVL	MS24693-C2		
19	AR	252-98-00022			TAPE, GLASS CLOTH, 1.0 WIDE	3M	277BY DESCRIPTION		
20	AR	060-12-00004			CMPO, SEALANT, GENL PURPOSE	G.E.	RTV-102		
E 1	1	255-98-00004			TERM, LUG, SOLDER, 12QID	ZIERICK	409		
J 1	1	063-98-00042			CONN, PLUG, 16PIN, RCP	AMPHENOL	26-159-16		
M 1	1	170-99-00045		21441-4	METER EDG, 1.0 BOT, 0 CTR	EMR	170-99-00045		
M 2	1	170-99-00045		21441-4	METER EDG, 1.0 BOT, 0 CTR	EMR	170-99-00045		
R 1	1	201-98-00272			POT, 1K 10% CERMET 100PPM	BECKMAN	78SBWR1K		
R 2	1	201-98-00272			POT, 1K 10% CERMET 100PPM	BECKMAN	78SBWR1K		
R 3	1	201-98-00273			POT, 500 OHM 10% .75W	BECKMAN	78SBWR500		
R 4	1	201-98-00273			POT, 500 OHM 10% .75W	BECKMAN	78SBWR500		
R 5	1	608-09-15800		624	RES. 1.58K 1% 1/10W	EMR	608-09-15800		
R 6	1	608-09-15800		624	RES. 1.58K 1% 1/10W	EMR	608-09-15800		
S 1	1	250-98-00051			SW, PB, MOM, SPST, N.O. MINTR	GRAYHILL	30-1		
S 2	1	250-98-00051			SW, PB, MOM, SPST, N.O. MINTR	GRAYHILL	30-1		
TP 1	5	143-98-00006			JACK, TEST PT, PNL TYPE, WHT	MML 16	016-8010-209		
THRU									
TP 5									
REF 1	1	905-13-00194		25222	WIRING DIAGRAM	EMR	905-13-00194		

Table 6-6

PARTS LIST				E M R - T E L E M E N T R Y				REV DATE 03/14/75				REV LTR C			
LIST TITLE CHAS, SUB, ASSY				24709				CHGE CONT NO. CODE IDENT SHT 1 OF 1				ECO 51320 CKD BY			
PART NO. 042-89-00187															
ITEM NO.	QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION				VENDOR NAME				VENDOR PART NUMBER			
1	1	042-89-00186	24708	CHAS, SUB, SUBASSY				EMR				042-89-00186			
2	1	205-89-01410	24637	PWA, DUAL DISCRIMINATOR				EMR				205-89-01410			
3	2	205-89-01411	24640	PWA, CHANNEL SELECTOR				EMR				205-89-01411			
4	2	205-89-01412	24643	PWA, LPOF				EMR				205-89-01412			
5	1	140-99-00226	30264	INSUL, 1.125X1.312 NOTCHED				EMR				140-99-00226			
6	2	140-99-00196	25289	INSUL, .30X1.4, 60X.01 THK				EMR				140-99-00196			
8	AR	229-02-00072		SCREW, 4-40X3/16 PAN HD				PRCMT OPTION				MS51957-12			
9	AR	229-02-00075		SCREW, 4-40X3/8 PAN HD				PRCMT OPTION				MS51957-15			
10	AR	273-02-00025		WASHER, #4, INT TOOTH				PRCMT OPTION				MS35333-70			
11	AR	287-02-00002		NUT, HEX, 4-40				PRCMT OPTION				MS35649-244			
12	AR	229-02-00079		SCREW, 4-40X3/4 PAN HD				PRCMT OPTION				MS51957-19			
13	AR	076-98-00004		CORD, NYLON LACE, B FINISH				QVL/GUDEBROD				MIL-T-43435 / #20			
14	AR	276-98-00102		WIRE, #24, STRD, WHT, 60OV				MML42				NAS-703-24-U-C-9			
15	AR	276-02-00048		WIRE, #24, SOL, WHT, 60OV				PRCMT OPTION				MIL-W-16878/4* SIL CTD*			
16	AR	276-02-00020		WIRE, #24, STRD, 2COND, SHLD				PRCMT OPTION				MIL-W-16878/4* SIL CTD*			
17	AR	268-98-00001		TUBING, 1/4, THERMO-FIT, WHT				PRCMT OPTION				MIL-W-16878/4* SIL CTD*			
18	AR	229-02-00231		SCREW, 4-40X1/4, 100FLT HD				RAYCHEM				RNF-100			
19	AR	252-98-00022		TAPE, GLASS CLOTH, 1.0 WIDE				QVL				MS24693-C2			
20	AR	060-12-00034		CMPD, SEALANT, GENL PURPOSE				3M				27/BY DESCRIPTION			
E	1	255-98-00004		TERM, LUG, SOLDER, .12GID				G.E.				RTV-102			
J	1	063-98-00042		CONN, PLUG, 16PIN, RCP				ZIERICK				409			
M	1	170-99-00045	21441-4	METER EDGW, L BOT, 0 CTR				AMPHENOL				26-159-16			
M	2	170-99-00045	21441-4	METER EDGW, L BOT, 0 CTR				EMR				170-99-00045			
R	1	170-99-00045		POT, 1K 10% CERMET 100PPM				EMR				170-99-00045			
R	1	201-98-00272		POT, 1K 10% CERMET 100PPM				BECKMAN				78SBRW1K			
R	2	201-98-00272		POT, 500 OHM 10% .75W				BECKMAN				78SBRW1K			
R	3	201-98-00273		POT, 500 OHM 10% .75W				BECKMAN				78SBRW500			
R	4	201-98-00273		POT, 500 OHM 10% .75W				BECKMAN				78SBRW500			
R	5	608-09-15800	624	RES. 1.58K 1% 1/10W				EMR				608-09-15800			
R	6	608-09-15800	624	RES. 1.58K 1% 1/10W				EMR				608-09-15800			
S	1	250-98-00051		SW, PB, MOM, SPST, N.O., MINTR				GRAYHILL				30-1			
S	2	250-98-00051		SW, PB, MOM, SPST, N.O., MINTR				GRAYHILL				30-1			
TP	1	143-98-00006		JACK, TEST PT, PNL TYPE, WHT				MML 16				016-8010-209			
THRU															
TP	5														
REF	1														
				WIRING DIAGRAM				EMR				905-13-00194			
				FIRST USAGE MODEL 4167-AX											
				25222											
				905-13-00194											

E M R - T E L E M E T R Y

PARTS LIST

24637

REV DATE 08/20/77

REV LTR K

LIST TITLE PWA,DUAL DISCRIMINATOR CHGE CONT NO. CODE IDENT SHT 1 OF 7

PART NO. 2C5-89-01410

ECO RECORD 1 06141 CKD BY

ITEM NO.	QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
1	1	204-89-00472	24636	PWB,DUAL DISCRIMINATOR	EMR	204-89-00472
2	2	298-99-00038	22855	HTSK,8AR	EMR	298-99-00038
3	6	298-98-00017		HTSK TO-18 2-56 SCREW	IERC	TXB2P-019-028B
4	AR	060-21-00002		CMPO,HEAT CONDUCTIVE GEL	DOW CORNING	DOW CORNING 340
5	8	273-98-00058		WASHER,.109IDX,2500C,MICA	SEASTROM	5624-8-5
6	8	049-98-00010		CLIP,THERMAL EQUALIZING	WAKEFIELD	259-18-25
7	2	298-98-00008		HTSK,FOR TO-5 PKG	IERC	TX8F-032-025B
8	42	189-98-00004		PAD,XSTR 4 PIN*USE OPTL*	DEL BLINN	100-000-NY
9	2	189-99-00001	800-1	PAD,XSTR TO-5,9 OR 11,4 P	EMR	189-99-00001
10	12	189-98-00011		PAD,XSTR,TO-5 BPIN,.075H	MILTON ROSS	10193-DAP
11	AR	276-99-00008	619-22	WIRE,#22,BUSS,SOLID	EMR	276-99-00008
12	AR	268-02-00046		TUBING,#22,EXTR TEF,WHT	QVL	MIL-1-22129
13	2	239-99-00125	27564	SPACER,MOD,.250DIA X .75L	EMR	239-99-C0125
14	AR	273-02-00004		WASHER,#4, FLT ST STL	PRCMT OPTION	MS15795-803
15	AR	273-02-00025		WASHER,#4,INT TOOTH	PRCMT OPTION	MS35333-70
16	AR	229-02-00074		SCREW,4-40X5/16 PAN HD	PRCMT OPTION	MS51957-14
1C 1	1	301-13-10003		CAP., 1.0MF 20% 50V LS.20	MML 48	8131-050-651-105M/MML
1C 2	1	301-71-10001		CAP., .01UF +80-20% 100V	ERIE/MALLORY	80500025001032/TA-.01
1C 3	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
1C 4	1	336-12-33003	601	CAP., 3.3MF 10% 15V	EMR	336-12-32003
1C 5	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
1C 6	1	304-08-03009	600	CAP., 30PF .5PF 500V	EMR	304-08-03009
1C 7	3	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
THRU						
1C 9	1	304-13-05109	600	CAP., 51PF 1% 500V	EMR	304-13-05109
1C 10	1	304-13-05109	600	CAP., 51PF 1% 500V	EMR	304-13-05109
1C 11	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
1C 12	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
1C 13	1	301-13-10002		CAP., 20PF .5PF 500V	EMR	304-08-02009
1C 14	1	304-08-02009	600	CAP., .1UF 20% 50V LS.203	MML 48	8131-050-651-104M/MML
1C 15	6	301-13-10002				
THRU						
1C 20	1	337-12-22004	601	CAP., 22MF 10% 15V	EMR	337-12-22004
1C 21	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
1C 22	1	384-05-10001	949	CAP., .0100MF 1% 50V	EMR	384-05-10001
1C 23	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
1C 24	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
1C 25	1	301-13-10002		CAP., .15MF 10% 35V	EMR	338-14-15004
1C 26	1	338-14-15004	601	CAP., 1.0MF 10% 35V	EMR	336-14-10003
1C 27	1	336-14-10003	601	CAP., 15MF 10% 35V	EMR	338-14-15004
1C 28	1	338-14-15004	601	CAP., .15MF 10% 35V	MML 48	8131-050-651-104M/MML
1C 29	1	301-13-10002		CAP., .15MF 10% 35V	EMR	338-14-15004
1C 30	1	338-14-15004	601	CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
1C 31	1	301-13-10002		CAP., 15PF .5PF 500V	EMR	304-01-01509
1C 32	1	304-01-01509	600			

FIRST USAGE MODEL 4167-A

Table 6-8 (Cont'd.).

205-89-01410			24637	SHT 2 OF 7			
ITEM NO.	QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER	
1CR 1 THRU	5	088-10-41480		DIODE, SW, 75V/5UA, 4NS/10MA	JEDEC	1N4148	
1CR 5	1	088-10-09361		DIODE, REF, 9V/7.5MA, .005 Ω	MML 2	1N936A/1N936B	
1CR 6	1	088-10-09642		DIODE, ZENER 0.4W 13.0V	JEDEC	1N9648	
1CR 7	1	088-10-41480		DIODE, SW, 75V/5UA, 4NS/10MA	JEDEC	1N4148	
1CR 8	1	088-10-41480		DIODE, SW, 75V/5UA, 4NS/10MA	JEDEC	1N4148	
1CR 9	1	088-10-41480		DIODE, SW, 75V/5UA, 4NS/10MA	JEDEC	1N4148	
1CR 10	1	088-10-48290		DIODE, STABISTOR, .84-1.25V	JEDEC	1N4829	
1CR 11	1	088-10-48290		DIODE, STABISTOR, .84-1.25V	JEDEC	1N4829	
1CR 12	1	088-97-08230		DIODE, REF. 6.2V $\bar{a}$ 7.5MA	MML 2	1N823	
1CR 13	1	088-97-08230		DIODE, REF. 6.2V $\bar{a}$ 7.5MA	MML 2	1N823	
1J 1 THRU	29	065-98-00045		CONT, PIN, .025SQ, .620L	BERG ELECT	75481-014	
1J 29	3	055-89-00001	956-1306	L ASSY	EMR	055-89-00001	
1L 1 THRU							
1L 3	1	263-35-00039		XSTR, NPN, MAT. PR, VBE1-VBE2	AMPEREX	A642/S	
1Q 1	1	263-99-00019	671	XSTR, NPN 2N708, 15V SW, ON	EMR	263-99-00019	
1Q 2	4	263-97-00093		XSTR, PNP, SWITCH/AMPL, 50V	MML 4	2N3251/2N3251A	
1Q 3 THRU							
1Q 6	1	263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A	
1Q 7	1	263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A	
1Q 8	1	263-97-00093		XSTR, PNP, SWITCH/AMPL, 50V	MML 4	2N3251/2N3251A	
1Q 9	1	263-97-00093		XSTR, PNP, SWITCH/AMPL, 50V	MML 4	2N3251/2N3251A	
1Q 10	1	263-10-30100		XSTR, NPN SW, HS	JEDEC	2N3010	
1Q 11	1	263-10-30100		XSTR, NPN SW, HS	EMR	263-99-00099	
1Q 12	4	263-99-00099	801	XSTR, NPN SW, HS	EMR	263-99-00099	
1Q 15 THRU							
1Q 15	1	263-10-30100		XSTR, NPN SW, HS	JEDEC	2N3010	
1Q 16	1	263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A	
1Q 17	1	263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A	
1Q 18	1	263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A	
1Q 19	1	263-10-29071		XSTR, PNP SW 60V, HFE 100	JEDEC	2N2907A	
1Q 20	1	263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A	
1R 1	1	616-02-51009		RES, 510 OHM 5% 1/4W	ALLEN BRAD	RC07GF511J	
1R 2	1	608-09-42200	624	RES, 4.22K 1% 1/10W	EMR	608-09-42200	
1R 3	1	616-02-05109		RES, 51 OHM 5% 1/4W	ALLEN BRAD	RC07GF510J	
1R 4	1	608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000	
1R 5	1	616-02-12000		RES, 1.2K 5% 1/4W	ALLEN BRAD	RC07GF122J	
1R 6	1	608-09-60400	624	RES, 6.04K 1% 1/10W	EMR	608-09-60400	
1R 7	1	616-02-10000		RES, 1K 5% 1/4W	ALLEN BRAD	RC07GF102J	
1R 8	1	616-02-10000		RES, 1K 5% 1/4W	ALLEN BRAD	RC07GF102J	
1R 9	1	616-02-10009		RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J	
1R 10	1	616-02-10001		RES, 10K 5% 1/4W	ALLEN BRAD	RC07GF103J	
1R 11	1	201-98-00146		POT, TRMR, 20 OHM 20% .5W	BECK/MML27	62PR20	
1R 12	1	616-02-10001		RES, 10K 5% 1/4W	ALLEN BRAD	RC07GF103J	
1R 13	1	616-02-39000		RES, 3.9K 5% 1/4W	ALLEN BRAD	RC07GF392J	
1R 14	1	616-02-20009		RES, 200 OHM 5% 1/4W	ALLEN BRAD	RC07GF201J	

FIRST USAGE MODEL 4167-A

Table 6-8 (Cont'd.).

205-89-01410				24637		SHT 3 OF 7			
ITEM NO.	QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER			
1R 15	1	616-02-20009		RES,200 OHM 5% 1/4W	ALLEN BRAD	RC07GF201J			
1R 16	1	608-09-43200	624	RES, 4.32K 1% 1/10W	EMR	608-09-43200			
1R 17	1	608-09-51100	624	RES, 5.11K 1% 1/10W	EMR	608-09-51100			
1R 18	1	616-02-39000		RES,3.9K 5% 1/4W	ALLEN BRAD	RC07GF392J			
1R 19	1	616-02-12001	624	RES,12K 5% 1/4W	ALLEN BRAD	RC07GF123J			
1R 20	1	608-09-10201	624	RES, 10.2K 1% 1/10W	EMR	608-09-10201			
1R 21	1	608-09-20000	624	RES. 2.0K 1% 1/10W	EMR	608-09-20000			
1R 22	1	608-09-11800	624	RES. 1.18K 1% 1/10W	EMR	608-09-11800			
1R 23	1	616-02-10009	624	RES,100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J			
1R 24	1	608-09-20000	624	RES. 2.0K 1% 1/10W	EMR	608-09-20000			
1R 25	1	608-09-20000	624	RES. 2.0K 1% 1/10W	EMR	608-09-20000			
1R 26	1	608-09-10201	624	RES, 10.2K 1% 1/10W	EMR	608-09-10201			
1R 27	1	608-09-30100	624	RES. 3.01K 1% 1/10W	EMR	608-09-30100			
1R 28	1	616-02-10009	624	RES,100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J			
1R 29	1	608-09-10000	624	RES. 1K 1% 1/10W	EMR	608-09-10000			
1R 30	1	608-09-10000	624	RES. 1K 1% 1/10W	EMR	608-09-10000			
1R 31	1	616-02-10009		RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J			
1R 32	1	616-02-12009	624	RES,120 OHM 5% 1/4W	ALLEN BRAD	RC07GF121J			
1R 33	1	608-09-10000	624	RES. 1K 1% 1/10W	EMR	608-09-10000			
1R 34	1	608-09-10000	624	RES. 1K 1% 1/10W	EMR	608-09-10000			
1R 35	1	616-02-12009	624	RES,120 OHM 5% 1/4W	ALLEN BRAD	RC07GF121J			
1R 36	1	608-09-10000	624	RES. 1K 1% 1/10W	EMR	608-09-10000			
1R 37	1	608-09-49909	624	RES, 499.0 OHM 1% 1/10W	EMR	608-09-49909			
1R 38	1	608-09-10000	624	RES. 1K 1% 1/10W	EMR	608-09-10000			
1R 39	1	608-09-49900	624	RES. 4.99K 1% 1/10W	EMR	608-09-49900			
1R 40	1	608-09-24300	624	RES, 2.43K 1% 1/10W	EMR	608-09-24300			
1R 41	1	608-09-00000	624	RES., *TVAR*	EMR	608-09-24300			
1R 42	1	608-09-00000	624	RES., *TVAR*	EMR	608-09-24300			
1R 43	1	608-09-24300	624	RES, 2.43K 1% 1/10W	EMR	608-09-24300			
1R 44	1	608-09-24300	624	RES, 2.43K 1% 1/10W	EMR	608-09-24300			
1R 45	1	608-09-63400	624	RES, 6.34K 1% 1/10W	EMR	608-09-63400			
1R 46	1	201-98-00134		POT,10MR,500 OHM 10% .5W	BECK/MML27	62PR500			
1R 47	1	626-13-12509	621*125041	RES, 125 OHM 3%	EMR	626-13-12509			
1R 48	1	608-09-10201	624	RES, 10.2K 1% 1/10W	EMR	608-09-10201			
1R 49	1	616-02-00279		RES, 2.7 OHM 5% 1/4W	ALLEN BRAD	RC07GF2R7J			
1R 50	1	626-13-12509	621*125041	RES, 125 OHM 3%	EMR	626-13-12509			
1R 51	1	608-09-10000	624	RES. 1K 1% 1/10W	EMR	608-09-10000			
1R 52	1	608-09-10000	624	RES. 1K 1% 1/10W	EMR	608-09-10000			
1R 53	1	616-02-51000		RES,5.1K 5% 1/4W	ALLEN BRAD	RC07GF512J			
1R 54	1	616-02-51000		RES,5.1K 5% 1/4W	ALLEN BRAD	RC07GF512J			
1R 55	1	608-09-30900	624	RES, 3.09K 1% 1/10W	EMR	608-09-30900			
1R 56	1	608-09-10000	624	RES. 1K 1% 1/10W	EMR	608-09-10000			
1R 57	1	608-09-49909	624	RES, 499.0 OHM 1% 1/10W	EMR	608-09-49909			
1R 58	1	608-09-18700	624	RES, 1.87K 1% 1/10W	EMR	608-09-18700			
1R 59	1	608-09-12400	624	RES, 1.24K 1% 1/10W	EMR	608-09-12400			
1R 60	1	616-02-10009		RES,100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J			
1R 61	1	616-02-10009		RES,100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J			
1R 62	1	608-09-10200	624	RES, 1.02K 1% 1/10W	EMR	608-09-10200			
1R 63	1	608-09-12101	624	RES, 12.1K 1% 1/10W	EMR	608-09-12101			
				4167-A					
				FIRST USAGE MODEL					

FIRST USAGE MODEL 4167-A

Table 6-8 (Cont'd.).

205-89-01410			24637		SHT 4 OF 77	
ITEM NO.	QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
1R 64	1	616-02-10009	624	RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
1R 65	1	608-09-00000		RES., *TVAR*		
1R 66	1	616-02-05109		RES, 51 OHM 5% 1/4W	ALLEN BRAD	RC07GF510J
1R 67	1	608-09-27400	624	RES. 2.74K 1% 1/10W	EMR	608-09-2740J
1P 7	1	608-09-63409	624	RES. 634.0 OHM 1% 1/10W	EMR	608-09-63409
1R 68	1	608-09-00000		RES., *TVAR*		
1P 1	1	143-98-00048		JACK, TEST PT, PW TYPE, BRN	E F JOHNSON	105-0858-001
1P 10	1	143-98-00010		JACK, TEST PT, PW TYPE, BLK	E F JOHNSON	105-0853-001
1U 1	1	046-34-00004		IC, LIN AMPL, OPNL	MML 48	LM301AH
1U 2	1	046-34-00022		IC, LIN AMPL, CUR DC/30MHZ	NSC	LHC002CH
1U 3	1	046-47-00001		IC, LIN AMPL, OPNL, COMPEN	PRCSN MONO	OP-01CJ DR UP-01EJ
1U 4	1	046-34-00014		IC, LIN VOLTAGE FOLLOWER	NSC/MML40	LM310H
1U 5	1	046-34-00014		IC, LIN VOLTAGE FOLLOWER	NSC/MML40	LM310H
1U 6	1	046-47-00001		IC, LIN AMPL, OPNL, COMPEN	PRCSN MONO	OP-01CJ DR UP-01EJ
1U 7	1	046-34-00023		IC, LIN RGLTR, 15V, NEG, .2A	NSC/MML40	LM320H15
2C 1	1	301-13-10003		CAP., 1.0MF 20% 50V LS.20	MML 48	8131-050-651-105M/MML
2C 2	1	301-71-10001		CAP., .01UF +80-20% 100V	ERIE/MALLOBY	805000250010327A-.01
2C 3	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 4	1	336-12-33003	601	CAP., 3.3MF 10% 15V	EMR	336-12-33003
2C 5	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 6	1	304-08-03009	600	CAP. 30PF .5PF 500V	EMR	304-08-03009
2C 7	3	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
THRU						
2C 9	1	304-13-05109	600	CAP. 51PF 1% 500V	EMR	304-13-05109
2C 10	1	304-13-05109	600	CAP. 51PF 1% 500V	EMP	304-13-05109
2C 11	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 12	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 13	1	304-08-02009	600	CAP., 20PF .5PF 500V	EMR	304-08-02009
2C 14	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 15	6	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
THRU						
2C 20	1	337-12-22004	601	CAP., 22MF 10% 15V	EMR	337-12-22004
2C 21	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 22	1	384-05-10001	949	CAP., .0100MF 1% 50V	EMR	384-05-10001
2C 23	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 24	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 25	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 26	1	338-14-15004	601	CAP., 15MF 10% 35V	EMR	338-14-15004
2C 27	1	336-14-10003	601	CAP. 1.0MF 10% 35V	EMR	336-14-10003
2C 28	1	338-14-15004	601	CAP., 15MF 10% 35V	EMR	338-14-15004
2C 29	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 30	1	338-14-15004		CAP., 15MF 10% 35V	EMR	338-14-15004
2C 31	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML
2C 32	1	304-01-01509	600	CAP. 15PF .5PF 500V	EMR	304-01-01509
2CR 1	5	088-10-41480		DIODE, SW, 75V/5UA, 4NS/10MA	JEDEC	1N4148
THRU						
2CR 5	1	088-10-09361		DIODE, REF, 9V/7.5MA, .005 %	MML 2	1N936A/1N936B
2CR 6	1	088-10-09642		DIODE, ZENER 0.4W 13.0V	JEDEC	1N9648
2CR 7	1					

FIRST USAGE MODEL 4167-A

Table 6-8 (Cont'd.).

ITEM NO.		QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
2CR 8	1		088-10-41480		DIODE, SW, 75V/5UA, 4NS/10MA	JEDEC	IN4148
2CR 9	1		088-10-41480		DIODE, SW, 75V/5UA, 4NS/10MA	JEDEC	IN4148
2CR 10	1		088-10-48290		DIODE, STABISTOR, .84-1.25V	JEDEC	IN4829
2CR 11	1		088-10-48290		DIODE, STABISTOR, .84-1.25V	JEDEC	IN4829
2CR 12	1		088-97-08230		DIODE, REF. 6.2V@7.5MA	MML 2	IN823
2CR 13	1		088-97-08230		DIODE, REF. 6.2V@7.5MA	MML 2	IN823
2J 1	29		065-98-00045		CONT, PIN, .025SQ, .620L	BERG ELECT	75481-014
2J 29							
2L 1	3		055-89-00001	956-1306	L, ASSY	EMR	055-89-00001
2L 3							
2Q 1	1		263-35-00039		XSTR, NPN, MAT. PR, VBE1-VBE2	AMPEREX	A642/S
2Q 2	1		263-99-00019	671	XSTR, NPN 2N708, 15V SW, ON	EMR	263-99-00019
2Q 3	4		263-97-00093		XSTR, PNP, SWITCH/AMPL, 50V	MML 4	2N3251/2N3251A
2Q 6							
2Q 7	1		263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A
2Q 8	1		263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A
2Q 9	1		263-97-00093		XSTR, PNP, SWITCH/AMPL, 50V	MML 4	2N3251/2N3251A
2Q 10	1		263-97-00093		XSTR, PNP, SWITCH/AMPL, 50V	MML 4	2N3251/2N3251A
2Q 11	1		263-10-30100		XSTR, NPN SW, HS	JEDEC	2N3010
2Q 12	4		263-99-00099	801	XSTR, NPN, SW, HS	EMR	263-99-00099
2Q 15							
2Q 16	1		263-10-30100		XSTR, NPN SW, HS	JEDEC	2N3010
2Q 17	1		263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A
2Q 18	1		263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A
2Q 19	1		263-10-29071		XSTR, PNP SW 60V, HFE 100	JEDEC	2N2907A
2Q 20	1		263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A
2R 1	1		616-02-51009		RES, 510 OHM 5% 1/4W	ALLEN BRAD	RC07GF511J
2R 2	1		608-09-42200	624	RES, 4-22K 1% 1/10W	EMR	608-09-42200
2R 3	1		616-02-05109		RES, 51 OHM 5% 1/4W	ALLEN BRAD	RC07GF510J
2R 4	1		608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000
2R 5	1		616-02-12000		RES, 1.2K 5% 1/4W	ALLEN BRAD	RC07GF122J
2R 6	1		608-09-60400	624	RES, 6.04K 1% 1/10W	EMR	608-09-60400
2R 7	1		616-02-10000		RES, 1K 5% 1/4W	ALLEN BRAD	RC07GF102J
2R 8	1		616-02-10000		RES, 1K 5% 1/4W	ALLEN BRAD	RC07GF102J
2R 9	1		616-02-10009		RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
2R 10	1		616-02-10001		RES, 10K 5% 1/4W	ALLEN BRAD	RC07GF103J
2R 11	1		201-98-00146		POT, TRMR, 20 OHM 20% .5W	BECK/MML27	62PR20
2R 12	1		616-02-10001		RES, 10K 5% 1/4W	ALLEN BRAD	RC07GF103J
2R 13	1		616-02-39000		RES, 3.9K 5% 1/4W	ALLEN BRAD	RC07GF392J
2R 14	1		616-02-20009		RES, 200 OHM 5% 1/4W	ALLEN BRAD	RC07GF201J
2R 15	1		616-02-20009		RES, 200 OHM 5% 1/4W	ALLEN BRAD	RC07GF201J
2R 16	1		608-09-43200	624	RES, 4-32K 1% 1/10W	EMR	608-09-43200
2R 17	1		608-09-51100	624	RES, 5.11K 1% 1/10W	EMR	608-09-51100
2R 18	1		616-02-39000		RES, 3.9K 5% 1/4W	ALLEN BRAD	RC07GF392J
2R 19	1		616-02-12001		RES, 12K 5% 1/4W	ALLEN BRAD	RC07GF123J

FIRST USAGE MODEL 4167-A

FIRST USAGE MODEL 4167-A

Table 6-8 (Cont'd.).

ITEM NO.		QTY REQD		E M R NUMBER		DRAWING OR SPEC NO.		DESCRIPTION		VENDOR NAME		VENDOR PART NUMBER	
2R 20	1	1	1	608-09-10201	1	624	1	RES, 10.2K 1% 1/10W	EMR	608-09-10201	608-09-10201	608-09-10201	608-09-10201
2R 21	1	1	1	608-09-20000	1	624	1	RES, 2.0K 1% 1/10W	EMR	608-09-20000	608-09-20000	608-09-20000	608-09-20000
2R 22	1	1	1	608-09-11800	1	624	1	RES, 1.18K 1% 1/10W	EMR	608-09-11800	608-09-11800	608-09-11800	608-09-11800
2R 23	1	1	1	616-02-10009	1	624	1	RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J	RC07GF101J	RC07GF101J	RC07GF101J
2R 24	1	1	1	608-09-20000	1	624	1	RES, 2.0K 1% 1/10W	EMR	608-09-20000	608-09-20000	608-09-20000	608-09-20000
2R 25	1	1	1	608-09-20000	1	624	1	RES, 2.0K 1% 1/10W	EMR	608-09-20000	608-09-20000	608-09-20000	608-09-20000
2R 26	1	1	1	608-09-10201	1	624	1	RES, 10.2K 1% 1/10W	EMR	608-09-10201	608-09-10201	608-09-10201	608-09-10201
2R 27	1	1	1	608-09-30100	1	624	1	RES, 3.01K 1% 1/10W	EMR	608-09-30100	608-09-30100	608-09-30100	608-09-30100
2R 28	1	1	1	616-02-10009	1	624	1	RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J	RC07GF101J	RC07GF101J	RC07GF101J
2R 29	1	1	1	608-09-10000	1	624	1	RES, 1K 1% 1/10W	EMR	608-09-10000	608-09-10000	608-09-10000	608-09-10000
2R 30	1	1	1	608-09-10000	1	624	1	RES, 1K 1% 1/10W	EMR	608-09-10000	608-09-10000	608-09-10000	608-09-10000
2R 31	1	1	1	616-02-10009	1	624	1	RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J	RC07GF101J	RC07GF101J	RC07GF101J
2R 32	1	1	1	616-02-10009	1	624	1	RES, 120 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J	RC07GF101J	RC07GF101J	RC07GF101J
2R 33	1	1	1	608-09-10000	1	624	1	RES, 1K 1% 1/10W	EMR	608-09-10000	608-09-10000	608-09-10000	608-09-10000
2R 34	1	1	1	616-02-12009	1	624	1	RES, 1K 1% 1/10W	EMR	608-09-10000	608-09-10000	608-09-10000	608-09-10000
2R 35	1	1	1	608-09-10000	1	624	1	RES, 120 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J	RC07GF101J	RC07GF101J	RC07GF101J
2R 36	1	1	1	608-09-10000	1	624	1	RES, 1K 1% 1/10W	EMR	608-09-10000	608-09-10000	608-09-10000	608-09-10000
2R 37	1	1	1	608-09-49909	1	624	1	RES, 499.0 OHM 1% 1/10W	EMR	608-09-49909	608-09-49909	608-09-49909	608-09-49909
2R 38	1	1	1	608-09-10000	1	624	1	RES, 1K 1% 1/10W	EMR	608-09-10000	608-09-10000	608-09-10000	608-09-10000
2R 39	1	1	1	608-09-49900	1	624	1	RES, 4.99K 1% 1/10W	EMR	608-09-49900	608-09-49900	608-09-49900	608-09-49900
2R 40	1	1	1	608-09-24300	1	624	1	RES, 2.43K 1% 1/10W	EMR	608-09-24300	608-09-24300	608-09-24300	608-09-24300
2R 41	1	1	1	608-09-00300	1	624	1	RES, *TVAR*	EMR	608-09-00300	608-09-00300	608-09-00300	608-09-00300
2R 42	1	1	1	608-09-00000	1	624	1	RES, *TVAR*	EMR	608-09-00000	608-09-00000	608-09-00000	608-09-00000
2R 43	1	1	1	608-09-24300	1	624	1	RES, 2.43K 1% 1/10W	EMR	608-09-24300	608-09-24300	608-09-24300	608-09-24300
2R 44	1	1	1	608-09-24300	1	624	1	RES, 6.34K 1% 1/10W	EMR	608-09-24300	608-09-24300	608-09-24300	608-09-24300
2R 45	1	1	1	608-09-63400	1	624	1	POT, TRMR, 500 OHM 10% 3W	BECK/MML27	62PR500	62PR500	62PR500	62PR500
2R 46	1	1	1	201-98-00134	1	624	1	RES, 125 OHM 3% 3W	EMR	626-13-12509	626-13-12509	626-13-12509	626-13-12509
2R 47	1	1	1	626-13-12509	1	624	1	RES, 10.2K 1% 1/10W	EMR	608-09-10201	608-09-10201	608-09-10201	608-09-10201
2R 48	1	1	1	608-09-10201	1	624	1	RES, 2.7 OHM 5% 1/4W	ALLEN BRAD	RC07GF287J	RC07GF287J	RC07GF287J	RC07GF287J
2R 49	1	1	1	616-02-00279	1	624	1	RES, 125 OHM 3% 3W	EMR	626-13-12509	626-13-12509	626-13-12509	626-13-12509
2R 50	1	1	1	626-13-12509	1	624	1	RES, 1K 1% 1/10W	EMR	608-09-10000	608-09-10000	608-09-10000	608-09-10000
2R 51	1	1	1	608-09-10000	1	624	1	RES, 1K 1% 1/10W	EMR	608-09-10000	608-09-10000	608-09-10000	608-09-10000
2R 52	1	1	1	616-02-51000	1	624	1	RES, 5.1K 5% 1/4W	ALLEN BRAD	RC07GF512J	RC07GF512J	RC07GF512J	RC07GF512J
2R 53	1	1	1	616-02-51000	1	624	1	RES, 5.1K 5% 1/4W	ALLEN BRAD	RC07GF512J	RC07GF512J	RC07GF512J	RC07GF512J
2R 54	1	1	1	608-09-30900	1	624	1	RES, 3.09K 1% 1/10W	EMR	608-09-30900	608-09-30900	608-09-30900	608-09-30900
2R 55	1	1	1	608-09-10000	1	624	1	RES, 1K 1% 1/10W	EMR	608-09-10000	608-09-10000	608-09-10000	608-09-10000
2R 56	1	1	1	608-09-10000	1	624	1	RES, 499.0 OHM 1% 1/10W	EMR	608-09-49909	608-09-49909	608-09-49909	608-09-49909
2R 57	1	1	1	608-09-49909	1	624	1	RES, 1.87K 1% 1/10W	EMR	608-09-18700	608-09-18700	608-09-18700	608-09-18700
2R 58	1	1	1	608-09-18700	1	624	1	RES, 1.24K 1% 1/10W	EMR	608-09-12400	608-09-12400	608-09-12400	608-09-12400
2R 59	1	1	1	608-09-12400	1	624	1	RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J	RC07GF101J	RC07GF101J	RC07GF101J
2R 60	1	1	1	616-02-10009	1	624	1	RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J	RC07GF101J	RC07GF101J	RC07GF101J
2R 61	1	1	1	608-09-10200	1	624	1	RES, 1.02K 1% 1/10W	EMR	608-09-10200	608-09-10200	608-09-10200	608-09-10200
2R 62	1	1	1	608-09-10200	1	624	1	RES, 12.1K 1% 1/10W	EMR	608-09-12101	608-09-12101	608-09-12101	608-09-12101
2R 63	1	1	1	616-02-10009	1	624	1	RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J	RC07GF101J	RC07GF101J	RC07GF101J
2R 64	1	1	1	608-09-00000	1	624	1	RES, *TVAR*	EMR	608-09-00000	608-09-00000	608-09-00000	608-09-00000
2R 65	1	1	1	616-02-05109	1	624	1	RES, 51 OHM 5% 1/4W	ALLEN BRAD	RC07GF510J	RC07GF510J	RC07GF510J	RC07GF510J
2R 66	1	1	1	608-09-27400	1	624	1	RES, 2.74K 1% 1/10W	EMR	608-09-27400	608-09-27400	608-09-27400	608-09-27400
2R 67	1	1	1	608-09-63409	1	624	1	RES, 634.0 OHM 1% 1/10W	EMR	608-09-63409	608-09-63409	608-09-63409	608-09-63409
2R 68	1	1	1										

FIRST USAGE MODEL 4167-A

Table 6-8 (Cont'd.).

ITEM NO.		QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
2K 09	1	1	608-09-00000	24637	RES, *TVAR*		
2TP 1	1	1	143-98-00348		JACK, TEST PT, PW TYPE, HRN	E F JOHNSON	105-0853-001
2TP 10	1	1	143-98-00010		JACK, TEST PT, PW TYPE, PLK	E F JOHNSON	105-0853-002
2U 1	1	1	046-34-00004		IC, LIN AMPL, OPNL	MML 40	LM301AH
2U 2	1	1	046-34-00022		IC, LIN AMPL, CUR DC/30MHZ	NSC	LH0002CH
2U 3	1	1	046-47-00001		IC, LIN AMPL, OPNL, COMPEN	PRCSN MONO	OP-01CJ OR UP-01EJ
2U 4	1	1	046-34-00014		IC, LIN VOLTAGE FOLLOWER	NSC/MML40	LM310H
2U 5	1	1	046-34-00014		IC, LIN VOLTAGE FOLLOWER	NSC/MML40	LM310H
2U 6	1	1	046-47-00001		IC, LIN AMPL, OPNL, COMPEN	PRCSN MONO	UP-01CJ OR UP-01EJ
2U 7	1	1	046-34-00023		IC, LIN RGLTR, 15V, NEG, .2A	NSC/MML40	LM320H15
REF 1	1	1	905-01-10004	24635	SCHEM, PWA, DUAL DISCR	EMR	905-01-10004
REF 2	1	1	905-04-00001	9500	SPEC, COMPONENT SPACING	EMR	905-04-00001
				FIRST USAGE MODEL 4167-A			

Table 6-9

E M R - T E L E M E T R Y

PARTS LIST			24637-1			REV DATE 08/20/77			REV LTR K		
LIST TITLE			PAA,DUAL DISCRIMINATOR			CHGE CONT NO.			CODE IDENT		
PART NO.			205-89-01471			ECO RECORD 1			06141		
ITEM NO.	QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER					
1	1	204-89-00486	24636-1	PWB,DUAL DISCRIMINATOR	EMR	204-89-00486					
2	1	298-99-00038	22855	HTSK,BAR	EMR	298-99-00038					
3	4	298-99-00038	22855	HTSK,BAR	EMR	298-99-00038					
4	AR	060-21-00002		CMPO,HEAT CONDUCTIVE GEL	DOW CORNING	DOW CORNING 340					
5	4	273-98-00058		WASHER,.1091DX,2500D,MICA	SEASTROM	5624-8-5					
6	4	049-98-00010		CLIP,THERMAL EQUALIZING	WAKEFIELD	259-18-25					
7	1	298-98-00008		HTSK,FOR TO-5 PKG	IERC	TXDF-032-0256					
8	21	189-98-00004		PAD,XSTR 4 PIN*USE OPTL*	DEL BLINN	100-000-NY					
9	1	189-99-00001	800-1	PAD,XSTR TO-5,9 OR 11,4 P	EMR	189-99-00001					
10	6	189-98-00011		WIRE,#22,BUSS,SOLID	MILTON ROSS	10193-DAP					
11	AR	276-99-00008	619-22	PAD,XSTR,TO-5 8PIN,.075H	EMR	276-99-00003					
12	AR	268-02-00046		WIRE,#22,BUSS,SOLID	QVL	MIL-1-22129					
13	2	239-99-00125	27564	TUBING,#22,EXTR TEF,WHT	EMR	239-99-00125					
14	AR	273-02-00004		SPACER,MOD,.250DIA X .75L	PRCMT OPTION	MS15795-803					
15	AR	273-02-00025		WASHER,#4, FLT ST STL	PRCMT OPTION	MS35333-70					
16	AR	229-02-00074		WASHER,#4, INT TOOTH	PRCMT OPTION	MS51957-14					
J 1	4	065-98-00045		SCREW,4-40X5/16 PAN HD	BERG ELECT	75481-014					
THRU				CONT,PIN,.025SQ,.620L							
1J 4	1	065-98-00045		CONT,PIN,.025SQ,.620L	BERG ELECT	75481-014					
1J 29	1	301-13-10003		CAP., 1.0MF 20% 50V LS.20	MML 48	8131-050-651-105M/MML					
2C 1	1	301-71-10001		CAP., .01UF +80-20% 100V	ERIE/MALLORY	805000Z5001032/TA-.01					
2C 2	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML					
2C 3	1	301-13-10002	601	CAP., 3.3MF 10% 15V	EMR	336-12-33003					
2C 4	1	336-12-33003		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML					
2C 5	1	301-13-10002		CAP., 30PF .5PF 500V	EMR	304-08-03009					
2C 6	1	304-08-03009	600	CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML					
2C 7	3	301-13-10002									
THRU											
2C 9	1	304-13-05109	600	CAP., 51PF 1% 500V	EMR	304-13-05109					
2C 10	1	304-13-05109	600	CAP., 51PF 1% 500V	EMR	304-13-05109					
2C 11	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML					
2C 12	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML					
2C 13	1	301-13-10002		CAP., 20PF .5PF 500V	EMR	304-08-02009					
2C 14	1	304-08-02009	600	CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML					
2C 15	6	301-13-10002									
THRU											
2C 20	1	337-12-22004	601	CAP., 22MF 10% 15V	EMR	337-12-22004					
2C 21	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML					
2C 22	1	384-05-75000	949	CAP., 7500PF 1% 50V	EMR	384-05-75000					
2C 23	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML					
2C 24	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 48	8131-050-651-104M/MML					
2C 25	1	301-13-10002	601	CAP., 15MF 10% 35V	EMR	338-14-15004					
2C 26	1	338-14-15004	601	CAP., 1.0MF 10% 35V	EMR	336-14-10003					
2C 27	1	336-14-10003	601	CAP., 15MF 10% 35V	EMR	338-14-15004					
2C 28	1	338-14-15004	601								
2C 29	1										
2C 30	1										

FIRST USAGE MODEL 4167-R

Table 6-9 (Cont'd.).

ITEM		QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
NO.							
2C	29	1	301-13-10002	601	CAP., .1UF 20% 50V LS.200	MML 49	8131-050-651-104M/MML
2C	30	1	338-14-15004		CAP., 15MF 10% 35V	EMR	338-14-15004
2C	31	1	301-13-10002		CAP., .1UF 20% 50V LS.200	MML 49	8131-050-651-104M/MML
2C	32	1	304-01-01509		CAP. 15PF .5PF 500V	EMR	304-01-01509
2CR	1	5	088-10-41480		DIODE,SW,75V/5UA,4NS/10MA	JEDEC	1N4148
THRU							
2CR	5	1	088-10-09361	601	DIODE,REF,9V/7.5MA,.005 Ω	MML 2	1N936A/1N9368
2CR	6	1	088-10-09642		DIODE,ZENER 0.4W 13.0V	JEDEC	1N9648
2CR	7	1	088-10-41480		DIODE,SW,75V/5UA,4NS/10MA	JEDEC	1N4148
2CR	8	1	088-10-41480		DIODE,SW,75V/5UA,4NS/10MA	JEDEC	1N4148
2CR	9	1	088-10-48290		DIODE,STABISTOR,.84-1.25V	JEDEC	1N4829
2CR	10	1	088-10-48290		DIODE,STABISTOR,.84-1.25V	JEDEC	1N4829
2CR	11	1	088-10-48290		DIODE,REF. 6.2V@7.5MA	MML 2	1N823
2CR	12	1	088-97-08230		DIODE,REF. 6.2V@7.5MA	MML 2	1N823
2CR	13	1	088-97-08230		CONT,PIN,.025SQ,.62CL	BERG ELECT	75481-014
2J	1	29	065-98-00045				
THRU							
2J	29	3	055-89-00001	956-1306	L,ASSY	EMR	055-89-00001
2L	1	1					
2L	3	1					
2Q	1	1	263-35-00039		XSTR,NPN,MAT.PR,VBE1-VBE2	AMPEREX	A642/S
2Q	2	1	263-99-00019	XSTR,NPN 2N708,15V SW,ON	EMR	263-99-00019	
2Q	3	4	263-57-00093	XSTR,PNP,SWITCH/AMPL,50V	MML 4	2N3251/2N3251A	
THRU							
2Q	6	1	263-10-22221	R01	XSTR,NPN 75V,DC/UHF AMPL	MML 4	2N2222A
2Q	7	1	263-10-22221		XSTR,NPN 75V,DC/UHF AMPL	MML 4	2N2222A
2Q	8	1	263-97-00093		XSTR,PNP,SWITCH/AMPL,50V	MML 4	2N3251/2N3251A
2Q	9	1	263-97-00093		XSTR,PNP,SWITCH/AMPL,50V	MML 4	2N3251/2N3251A
2Q	10	1	263-10-30100		XSTR,NPN SW,HS	JEDEC	2N3010
2Q	11	1	263-99-00099		XSTR,NPN,SW,HS	EMR	263-99-00099
2Q	12	4					
THRU							
2Q	15	1	263-10-30100	624	XSTR,NPN SW,HS	JEDEC	2N3010
2Q	16	1	263-10-22221		XSTR,NPN 75V,DC/UHF AMPL	MML 4	2N2222A
2Q	17	1	263-10-22221		XSTR,NPN 75V,DC/UHF AMPL	MML 4	2N2222A
2Q	18	1	263-10-22221		XSTR,PNP SW 60V,HFE 100	JEDEC	2N2907A
2Q	19	1	263-10-29071		XSTR,NPN 75V,DC/UHF AMPL	MML 4	2N2222A
2Q	20	1	263-10-22221		RES,510 OHM 5% 1/4W	ALLEN BRAD	RC07GF511J
2R	1	1	616-02-51009		RES, 4.22K 1% 1/10W	EMR	608-09-42200
2R	2	1	608-09-42200		RES,51 OHM 5% 1/4W	ALLEN BRAD	RC07GF510J
2R	3	1	616-02-05109		RES, 1K 1% 1/10W	EMR	608-09-10000
2R	4	1	608-09-10000		RES,1.2K 5% 1/4W	ALLEN BRAD	RC07GF122J
2R	5	1	616-02-12000	RES, 6.04K 1% 1/10W	EMR	608-09-60400	
2R	6	1	608-09-60400	RES,1K 5% 1/4W	ALLEN BRAD	RC07GF102J	
2R	7	1	616-02-10000	RES,1K 5% 1/4W	ALLEN BRAD	RC07GF102J	
2R	8	1	616-02-10000	RES,100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J	
2R	9	1	616-02-10009	RES,10K 5% 1/4W	ALLEN BRAD	RC07GF103J	
2R	10	1	616-02-10001				

FIRST USAGE MODEL 4167-R

Table 6-9 (Cont'd.).

205-89-01471			24637-1		SHT 3 OF 4	
ITEM NO.	QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
2R 11	1	201-98-00146		POT, TRMR, 20 OHM 20% .5W	BECK/MML27	62PR20
2R 12	1	616-02-10001		RES, 10K 5% 1/4W	ALLEN BRAD	RC07GF103J
2R 13	1	616-02-39000		RES, 3.9K 5% 1/4W	ALLEN BRAD	RC07GF392J
2R 14	1	616-02-20009		RES, 200 OHM 5% 1/4W	ALLEN BRAD	RC07GF201J
2R 15	1	616-02-20009		RES, 4.32K 1% 1/10W	EMR	RC07GF201J
2R 16	1	608-09-43200	624	RES, 5.11K 1% 1/10W	EMR	608-09-43200
2R 17	1	608-09-51100	624	RES, 3.9K 5% 1/4W	ALLEN BRAD	608-09-51100
2R 18	1	616-02-39000		RES, 12K 5% 1/4W	ALLEN BRAD	RC07GF392J
2R 19	1	616-02-12001	624	RES, 10.2K 1% 1/10W	EMR	RC07GF123J
2R 20	1	608-09-10201	624	RES, 2.0K 1% 1/10W	EMR	608-09-10201
2R 21	1	608-09-20000	624	RES, 1.18K 1% 1/10W	EMR	608-09-20000
2R 22	1	608-09-11800	624	RES, 100 OHM 5% 1/4W	ALLEN BRAD	608-09-11800
2R 23	1	616-02-10009		RES, 2.0K 1% 1/10W	EMR	RC07GF101J
2R 24	1	608-09-20000	624	RES, 2.0K 1% 1/10W	EMR	608-09-20000
2R 25	1	608-09-20000	624	RES, 2.0K 1% 1/10W	EMR	608-09-20000
2R 26	1	608-09-10201	624	RES, 10.2K 1% 1/10W	EMR	608-09-10201
2R 27	1	608-09-30100	624	RES, 3.01K 1% 1/10W	EMR	608-09-30100
2R 28	1	616-02-10009		RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
2R 29	1	608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000
2R 30	1	608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000
2R 31	1	616-02-10009		RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
2R 32	1	616-02-12009		RES, 120 OHM 5% 1/4W	ALLEN BRAD	RC07GF121J
2R 33	1	608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000
2R 34	1	608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000
2R 35	1	616-02-12009		RES, 120 OHM 5% 1/4W	ALLEN BRAD	RC07GF121J
2R 36	1	608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000
2R 37	1	608-09-49900	624	RES, 499.0 OHM 1% 1/10W	EMR	608-09-49900
2R 38	1	608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000
2R 39	1	608-09-49900	624	RES, 4.99K 1% 1/10W	EMR	608-09-49900
2R 40	1	608-09-24300	624	RES, 2.43K 1% 1/10W	EMR	608-09-24300
2R 41	1	608-09-00000		RES, *TVAR*		
2R 42	1	608-09-00000		RES, *TVAR*		
2R 43	1	608-09-24300	624	RES, 2.43K 1% 1/10W	EMR	608-09-24300
2R 44	1	608-09-24300	624	RES, 2.43K 1% 1/10W	EMR	608-09-24300
2R 45	1	608-09-63400	624	RES, 6.34K 1% 1/10W	EMR	608-09-63400
2R 46	1	201-98-00134		POT, TRMR, 500 OHM 10% .5W	BECK/MML27	62PR500
2R 47	1	626-13-12509	621*125041	RES, 125 OHM 3% 3W	EMR	626-13-12509
2R 48	1	608-09-10201	624	RES, 10.2K 1% 1/10W	EMR	608-09-10201
2R 49	1	616-02-00279		RES, 2.7 OHM 5% 1/4W	ALLEN BRAD	RC07GF27J
2R 50	1	626-13-12509	621*125041	RES, 125 OHM 3% 3W	EMR	626-13-12509
2R 51	1	608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000
2R 52	1	608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000
2R 53	1	616-02-51000		RES, 5.1K 5% 1/4W	ALLEN BRAD	RC07GF512J
2R 54	1	616-02-51000		RES, 5.1K 5% 1/4W	ALLEN BRAD	RC07GF512J
2R 55	1	608-09-30900	624	RES, 3.09K 1% 1/10W	EMR	608-09-30900
2R 56	1	608-09-10000	624	RES, 1K 1% 1/10W	EMR	608-09-10000
2R 57	1	608-09-49900	624	RES, 499.0 OHM 1% 1/10W	EMR	608-09-49900
2R 58	1	608-09-18700	624	RES, 1.87K 1% 1/10W	EMR	608-09-18700
2R 59	1	608-09-12400	624	RES, 1.24K 1% 1/10W	EMR	608-09-12400

FIRST USAGE MODEL 4167-R

Table 6-9 (Cont'd.).

ITEM NO.		QTY REQ	E M R NUMER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
2R 60	1	616-02-10009			RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
2R 61	1	616-02-10009			RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
2R 62	1	608-09-10200		624	RES, 1.02K 1% 1/10W	EMR	608-09-10200
2R 63	1	608-09-12101		624	RES, 12.1K 1% 1/10W	EMR	608-09-12101
2R 64	1	616-02-10009			RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
2R 65	1	608-09-00005			RES, TVAR*		
2R 66	1	616-02-05109			RES, 51 OHM 5% 1/4W	ALLEN BRAD	RC07GF510J
2R 67	1	608-05-27400		624	RES, 2.74K 1% 1/10W	EMR	608-09-27400
2R 68	1	608-09-63409		624	RES, 634.0 OHM 1% 1/10W	EMR	608-09-63409
2R 69	1	608-09-00000			RES, TVAR*		
2TP 1	1	143-98-00048			JACK, TEST PT, PW TYPE, BRN	E F JOHNSON	105-0858-001
2TP 10	1	143-98-00010			JACK, TEST PT, PW TYPE, BLK	E F JOHNSON	105-0853-001
2U 1	1	046-34-00004			IC, LIN AMPL, OPNL	MML 40	LM301AH
2U 2	1	046-34-00026			IC, LIN AMPL, CUR DC/30MHZ	NSC	LH0002CH/LH0002CN
2U 3	1	046-47-00001			IC, LIN AMPL, OPNL, COMPEN	PRCSN MONU	OP-01CJ OR OP-01EJ
2U 4	1	046-34-00014			IC, LIN VOLTAGE FOLLOWER	NSC/MML40	LM310H
2U 5	1	046-34-00014			IC, LIN VOLTAGE FOLLOWER	NSC/MML40	LM310H
2U 6	1	046-47-00001			IC, LIN AMPL, OPNL, COMPEN	PRCSN MOND	OP-01CJ OR OP-01EJ
2U 7	1	046-34-00023			IC, LIN RGLTR, 15V, NEG, .2A	NSC/MML40	LM320H15
REF 1	1	905-01-10004		24635	SCHEM, PWA, DUAL DISCR	EMR	905-01-10004
REF 2	1	905-04-00001		9500	SPEC, COMPONENT SPACING	EMR	905-04-00001

FIRST USAGE MODEL 4167-R

Table 6-10

PARTS LIST			E M R - T E L E M E T R Y			REV DATE 05/13/74			REV LTR B		
LIST TITLE			24640			CHGE CONT NO.			CODE IDENT		
PART NO.			205-89-01411			ECO 49085			06141		
ITEM NO.	QTY REQD	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER					
1	1	204-89-00473	24639	PWB, CHANNEL SELECTOR	EMR	204-89-00473					
2	3	189-99-00003	800-7	PAD, XSTR 4 PIN*USE OPTL*	EMR	189-99-00003					
3	1	232-99-00077	24792	SHIELD, CHAN SEL, 1.65X5.17	EMR	232-99-00077					
4	AR	229-02-00235		SCREW, 4-40X3/16, 100FLT HD	QVL	MS24693-C1					
5	1	196-99-00239	10663-2	PLATE, NAME EQUIP IDENT	EMR	196-99-00239					
6	AR	268-98-00001		TUBING, 1/4, THERMO-FIT, WHT	RAYCHEM	RNF-100					
C 1	1	301-13-10003		CAP, .1UMF 20% 50V LS, 20	MML 48	8131-050-651-105M/MML					
C 2	1	999-01-00001	24658	CAP, #FVAR*							
C 3	1	999-01-00002	24658	CAP, #FVAR*							
C 4	1	999-01-00003	24658	CAP, #FVAR*							
C 5	1	999-01-00004	24658	CAP, #FVAR*							
C 6	1	999-01-00001	25196	CAP, #FVAR*							
C 7	1	999-01-00002	25196	CAP, #FVAR*							
C 8	1	999-01-00003	25196	CAP, #FVAR*							
C 9	1	999-01-00004	25196	CAP, #FVAR*							
C 10	1	999-01-00005	25196	CAP, #FVAR*							
C 11	1	999-01-00006	25196	CAP, #FVAR*							
C 12	1	999-01-00007	25196	CAP, #FVAR*							
C 13	1	999-01-00008	25196	CAP, #FVAR*							
C 14	1	301-13-10002		CAP, .1UF 20% 50V LS, 200	MML 48	8131-050-651-104M/MML					
C 15	1	301-13-10002		CAP, .1UF 20% 50V LS, 200	MML 48	8131-050-651-104M/MML					
C 16	1	088-10-41480		DIODE, SW, 75V/50A, 4NS/10MA	JEDC	IN4148					
CR 1	1	088-10-41480		DIODE, SW, 75V/50A, 4NS/10MA	JEDC	IN4148					
CR 2	1	088-10-41480		DIODE, SW, 75V/50A, 4NS/10MA	JEDC	IN4148					
L 1	1	999-01-00005	24658	L, #FVAR*							
L 2	1	999-01-00006	24658	L, #FVAR*							
L 3	1	999-01-00007	24658	L, #FVAR*							
P 1	20	365-98-00012		CONT, PCB MOUNT RECEPTACLE	AMP	85861-4					
THRU											
P 20											
Q 1	3	263-10-22221		XSTR, NPN 75V, DC/UHF AMPL	MML 4	2N2222A					
THRU											
Q 3											
R 1	1	616-02-10009		RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J					
R 2	1	616-02-10009		RES, 100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J					
R 3	1	616-02-51009		RES, 510 OHM 5% 1/4W	ALLEN BRAD	RC07GF511J					
R 4	1	616-02-47009		RES, 470 OHM 5% 1/4W	ALLEN BRAD	RC07GF471J					
R 5	1	616-02-20009		RES, 200 OHM 5% 1/4W	ALLEN BRAD	RC07GF201J					
R 6	1	616-02-47009		RES, 470 OHM 5% 1/4W	ALLEN BRAD	RC07GF471J					
R 7	1	616-02-10009		RES, 1K 5% 1/4W	ALLEN BRAD	RC07GF102J					
R 8	1	999-01-00008	24658	RES, #FVAR*							
R 9	1	616-02-12002		RES, 120K 5% 1/4W	ALLEN BRAD	RC07GF124J					
R 10	1	616-02-20003		RES, 2K 5% 1/4W	ALLEN BRAD	RC07GF202J					
R 11	1	999-01-00009	24658	RES, #FVAR*							
R 12	1	616-02-36000		RES, 3.6K 5% 1/4W	ALLEN BRAD	RC07GF362J					
R 13	1	999-01-00009	25196	RES, #FVAR*							

FIRST USAGE MODEL 4167-B

Table 6-10 (Cont'd.).

ITEM NO.		QTY BLND	E M R NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
R 14		1	999-01-00010	25196	RES,*FVAR*		
R 15		1	999-01-00011	25196	RES,*FVAR*		
R 16		1	999-01-00012	25196	RES,*FVAR*		
R 17		1	999-01-00013	25196	RES,*FVAR*		
R 18		1	999-01-00014	25196	RES,*FVAR*		
R 19		1	999-01-00015	25196	RES,*FVAR*		
R 20		1	999-01-00016	25196	RES,*FVAR*		
R 21		1	999-01-00017	25196	RES,*FVAR*		
R 22		1	616-09-00000		RES,*TVAR*		
REF 4		1	905-01-10005	24638	SCHEM,PWA,CHANNEL SEL	EMR	905-01-10005
REF 2		1	905-05-00318	24658	VAR,CHART,CHAN SEL,BP	EMR	905-05-00318
REF 3		1	905-04-00001	9500	SPEC,COMPONENT SPACING	EMR	905-04-00001
REF 4		1	905-05-00350	25196	VAR,CHART,CHAN SEL,TMG	EMR	905-05-00350
FIRST USAGE MODEL 4167-B							
				24640			
				205-89-01411			
						SHT 2 OF 2	

Table 6-11

PARTS LIST				24643	REV DATE 06/01/73	REV LTR	
LIST TITLE		PWA,LPOF		CHGE CONT NO.	CODE IDENT	SHF 1 OF 1	
PART NO.		205-89-01412		ECC	06141	CKD BY	
ITEM NO.	QTY	REQD	E M R	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
1	1		204-89-00474	24642	PWA,LPOF	EMR	204-89-00474
2	1		232-99-00076	24793	SHIELD,LPOF,1.65X2.40	EMR	232-99-00076
3	AR		229-98-00095		SCREW,SHEET METAL,#4,1/4L	SEEVOK PROD.	55-4-40
4	AR		276-99-00008		WIRE,#22,BUSS,SOLID	EMR	276-99-00008
5	1		196-99-00239	10663-2	PLATE,NAME EQUIP IDENT	EMR	196-99-00239
C 1	1		999-01-00001	24659	CAP,*FVAR*		
C 2	1		999-01-00002	24659	CAP,*FVAR*		
C 3	1		999-01-00003	24659	CAP,*FVAR*		
C 4	1		999-01-00004	24659	CAP,*FVAR*		
C 5	1		999-01-00005	24659	CAP,*FVAR*		
C 6	1		999-01-00006	24659	CAP,*FVAR*		
C 7	1		999-01-00007	24659	CAP,*FVAR*		
C 8	1		999-01-00008	24659	CAP,*FVAR*		
C 9	1		999-01-00009	24659	CAP,*FVAR*		
C 10	1		999-01-00010	24659	CAP,*FVAR*		
C 11	1		999-01-00011	24659	CAP,*FVAR*		
C 12	1		999-01-00012	24659	CAP,*FVAR*		
C 13	1		999-01-00013	24659	CAP,*FVAR*		
C 14	1		999-01-00014	24659	CAP,*FVAR*		
R 1	1		999-01-00015	24659	RES,*FVAR*		
R 2	1		999-01-00016	24659	RES,*FVAR*		
R 3	1		999-01-00017	24659	RES,*FVAR*		
R 4	1		999-01-00018	24659	RES,*FVAR*		
R 5	1		999-01-00019	24659	RES,*FVAR*		
REF 1	1		905-01-10006	24641	SCHEM,PWA,LPOF	EMR	905-01-10006
REF 2	1		905-05-00319	24659	VARIABLE CHART,LPOF	EMR	905-05-00319
REF 3	1		905-04-00001	9530	SPEC,COMPONENT SPACING	EMR	905-04-00001
				FIRST USAGE MODEL 4167-G			

Table 6-12

PARTS LIST		24922	REV DATE 11/26/73		REV LTR A	
LIST TITLE		PWA, DELAY LINE	CHGE CONT NO.		SHT 1 OF	
PART NO.		204-89-01413	ECO 48361		CKD 8Y	
ITEM NO.	QTY REQD	EMR NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
1	1	204-89-00475	24921	PWB, DELAY LINE	EMR	204-89-00475
2	4	189-98-00004		PAD, XSTR 4 PIN USE OPTL	DEL BLINN	100-000-NY
3	1	232-99-00078	24706	SHIELD, DLY LINE, 2.75X3.94	EMR	232-99-00078
4	AR	229-94-00140		SCREW, #4-40 TAPPING 5/8L	PRCMT OPTION	FXS/8L BY DESCRIPTION
5	1	140-99-00170	21368-26	INSUL, .50X2.25X.01 THK	EMR	140-99-00170
C 1	1	999-01-00001	24344	CAP, *FVAR*		
C 2	1	999-01-00002	24344	CAP, *FVAR*		
C 3	1	999-01-00003	24344	CAP, *FVAR*		
C 4	1	999-01-00004	24344	CAP, *FVAR*		
C 5	1	999-01-00005	24344	CAP, *FVAR*		
C 6	1	999-01-00006	24344	CAP, *FVAR*		
C 7	1	999-01-00007	24344	CAP, *FVAR*		
C 8	1	999-01-00008	24344	CAP, *FVAR*		
C 9	1	999-01-00009	24344	CAP, *FVAR*		
C 10	1	999-01-00010	24344	CAP, *FVAR*		
C 11	1	999-01-00011	24344	CAP, *FVAR*		
C 12	1	999-01-00012	24344	CAP, *FVAR*		
C 13	1	999-01-00013	24344	CAP, *FVAR*		
C 14	1	999-01-00014	24344	CAP, *FVAR*		
C 15	1	999-01-00015	24344	CAP, *FVAR*		
C 16	1	999-01-00016	24344	CAP, *FVAR*		
C 17	1	999-01-00017	24344	CAP, *FVAR*		
C 18	1	999-01-00018	24344	CAP, *FVAR*		
C 19	1	999-01-00019	24344	CAP, *FVAR*		
C 20	1	999-01-00020	24344	CAP, *FVAR*		
C 21	1	999-01-00021	24344	CAP, *FVAR*		
C 22	1	999-01-00022	24344	CAP, *FVAR*		
C 23	1	999-01-00023	24344	CAP, *FVAR*		
C 24	1	999-01-00024	24344	CAP, *FVAR*		
C 25	1	999-01-00025	24344	CAP, *FVAR*		
C 26	1	999-01-00026	24344	CAP, *FVAR*		
C 27	1	999-01-00027	24344	CAP, *FVAR*		
C 28	1	999-01-00028	24344	CAP, *FVAR*		
C 29	4	301-71-10001		CAP, .01MF -20% 100V	ERIE	805-000 X5VQ 103Z
THRU						
32						
CK 1	1	088-10-41480		DIODE, SW, 75V/5UA, 4NS/10MA	JEDEC	1N4148
CK 2	1	088-10-41480		DIODE, SW, 75V/5UA, 4NS/10MA	JEDEC	1N4148
L 1	1	999-01-00029	24344	L, *FVAR*		
L 2	1	999-01-00030	24344	L, *FVAR*		
L 3	1	999-01-00031	24344	L, *FVAR*		
L 4	1	999-01-00032	24344	L, *FVAR*		
L 5	1	999-01-00033	24344	L, *FVAR*		
L 6	1	999-01-00034	24344	L, *FVAR*		
L 7	1	999-01-00035	24344	L, *FVAR*		

FIRST USAGE MODEL 4167-R

Table 6-12 (Cont'd.)

205-89-01413

24992

SHT 2 OF

ITEM NO.	QTY	EMR NUMBER	DRAWING OR SPEC NO.	DESCRIPTION	VENDOR NAME	VENDOR PART NUMBER
L 8	1	999-01-00036	24344	L,*FVAR*		
L 9	1	999-01-00037	24344	L,*FVAR*		
L 10	1	999-01-00038	24344	L,*FVAR*		
L 11	1	999-01-00039	24344	L,*FVAR*		
L 12	1	999-01-00040	24344	L,*FVAR*		
L 13	1	999-01-00041	24344	L,*FVAR*		
L 14	1	999-01-00042	24344	L,*FVAR*		
L 15	1	999-01-00043	24344	L,*FVAR*		
L 16	1	999-01-00044	24344	L,*FVAR*		
L 17	1	999-01-00045	24344	L,*FVAR*		
L 18	1	999-01-00046	24344	L,*FVAR*		
L 19	1	999-01-00047	24344	L,*FVAR*		
L 20	1	999-01-00048	24344	L,*FVAR*		
L 21	1	999-01-00049	24344	L,*FVAR*		
L 22	1	999-01-00050	24344	L,*FVAR*		
L 23	1	999-01-00051	24344	L,*FVAR*		
L 24	1	999-01-00052	24344	L,*FVAR*		
L 25	1	999-01-00053	24344	L,*FVAR*		
L 26	1	999-01-00054	24344	L,*FVAR*		
L 27	1	999-01-00055	24344	L,*FVAR*		
L 28	1	999-01-00056	24344	L,*FVAR*		
P 1	4	065-98-00012		CCNT,PCB MOUNT RECEPTACLE AMP		85861-4
THRU						
P 4						
P 29	1	065-98-00012		CCNT,PCB MOUNT RECEPTACLE AMP	AMP	85861-4
Q 1	4	263-10-22221		XSTR,NPN 75V,DC/UHF AMPL	MML 4	2N22224
THRU						
J 4						
J 1	1	616-02-10009		RES,100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
J 2	1	616-02-10009		RES,100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
R 3	1	616-02-47009		RES,470 OHM 5% 1/4W	ALLEN BRAD	RC07GF471J
J 4	1	616-02-47009		RES,470 OHM 5% 1/4W	ALLEN BRAD	RC07GF471J
J 5	1	616-02-10000		RES,1K 5% 1/4W	ALLEN BRAD	RC07GF102J
J 6	1	999-01-00057	24344	RES,*FVAR*		
J 7	1	616-02-12002		RES,120K 5% 1/4W	ALLEN BRAD	RC07GF124J
J 8	1	623-02-10000		RES, 1K 5% 1W	ALLEN BRAD	RC32GF102J
J 9	1	616-02-10009		RES,100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
J 10	1	616-02-10009		RES,100 OHM 5% 1/4W	ALLEN BRAD	RC07GF101J
J 11	1	999-01-00058	24344	RES,*FVAR*		
J 12	1	616-02-47009		RES,470 OHM 5% 1/4W	ALLEN BRAD	RC07GF471J
J 13	1	999-01-00059	24344	RES,*FVAR*		
J 14	1	616-02-47009		RES,470 OHM 5% 1/4W	ALLEN BRAD	RC07GF471J
J 15	1	616-02-10000		RES,1K 5% 1/4W	ALLEN BRAD	RC07GF102J
J 16	1	616-02-20000		RES,2K 5% 1/4W	ALLEN BRAD	RC07GF202J
FF 1	1	905-01-10007	24990	SCHEM,PWA,DELAY LINE	EMR	905-01-10007
LF 2	1	905-05-00320	24344	VARIABLE CHART,DELAY LINE	EMR	905-05-00320
REF 3	1	905-04-00001	9500	SPEC,COMPONENT SPACING	EMR	905-04-00001

FIRST USAGE MODEL 4167-R

Table 6-13. EMR 4167-01 Recommended Spares

ITEM NO.	PART DESCRIPTION	EMR STOCK NO.	VENDOR NAME	VENDOR PART NO.	TQ	RS	PRICE
001	DIODE, Ref., 9V/7.5 mA, .005%	088-10-09361	Motorola	1N936A/ 1N936B	2	1	
002	DIODE, Voltage Regulator, 13V $\pm$ 5%	088-10-09642	JEDEC	1N964B	2	1	
003	DIODE, Switch, 75V/5UA, 4NS/10MA	088-10-41480	JEDEC	1N4148	16	2	
004	DIODE, Stabistor, .84-1.25V	088-10-48290	JEDEC	1N4829	4	1	
005	DIODE, Reference, 6.2V/7.5 mA	088-97-08230	Motorola	1N823	4	1	
006	INDUCTOR, Assembly	055-89-00001	Ferroxcube	213T0503E2A	6	1	
007	INTEGRATED CIRCUIT, Operational Amplifier, 18V	046-34-00004	NSC	LM301AH	2	1	
008	INTEGRATED CIRCUIT, Voltage Follower	046-34-00014	NSC	LM310H	4	1	
009	INTEGRATED CIRCUIT, Current Amplifier, DC to 30 MHz	046-34-00022	NSC	LH0002CH	2	1	
010	INTEGRATED CIRCUIT, Voltage Regulator, Neg. 15V, 1.5A	046-34-00023	NSC	LM320H15	2	1	
011	INTEGRATED CIRCUIT, Operational Amplifier, High-Slew	046-47-00001	Prctsn. Mono.	OP-01CJ	4	1	
012	JACK, Test Point, White	143-98-00006	Sealectro	SKT-8 or SKT-10	5	2	
013	JACK, Test Point, Black	143-98-00010	E.F. Johnson	105-853	2	1	
014	JACK, Test Point, Brown	143-98-00048	E.F. Johnson	105-858	2	1	
015	METER, Edgewise, L Bot., 0 Ctr.	170-99-00045	EMR-T	170-99-00045	2	1	
016	POTENTIOMETER, 500 Ω $\pm$ 30%, 1/2W	201-98-00134	Beckman	62PR500	2	1	
017	POTENTIOMETER, 20 Ω $\pm$ 30%, 1/2W	201-98-00146	Beckman	62PR20	2	1	
018	POTENTIOMETER, 1K $\pm$ 10%, Cermet, 100 ppm	201-98-00272	Beckman	78SBWR1K	2	1	
019	POTENTIOMETER, 500 Ω $\pm$ 10%, .75W	201-98-00273	Beckman	78SBWR500	2	1	
020	RESISTOR, 125 Ω $\pm$ 3%, 3W	626-13-12509	EMR-T	626-13-12509	4	1	
021	TRANSISTOR, NPN, 75V, DC/UHF Amplifier	263-10-22221	Amelco	2N2222A	13	1	
022	TRANSISTOR, PNP, Switch, 60V, HFE	263-10-29071	JEDEC	2N2907A	2	1	
023	TRANSISTOR, NPN, Switch, VCB, 15V	263-10-30100	JEDEC	2N3010	4	1	

Table 6-13 (Cont'd.). EMR 4167-01 Recommended Spares

ITEM NO.	PART DESCRIPTION	EMR STOCK NO.	VENDOR NAME	VENDOR PART NO.	TQ	RS	PRICE
024	TRANSISTOR, PNP, Switch/Amplifier, 50V	263-10-32510	Motorola	2N3251	12	1	
025	TRANSISTOR, NPN, Matched Pair, VBE1-VBE2	263-35-00039	Amperex	A642/S	2	1	
026	TRANSISTOR, NPN, 15V, Sw., On	263-99-00019	G.E.	2N708	2	1	
027	TRANSISTOR, NPN, 20V, Sw., 350 MHz	263-99-00099	Motorola	2N2501	8	1	

Table 6-14. EMR 4167-02 Recommended Spares

ITEM NO.	PART DESCRIPTION	EMR STOCK NO.	VENDOR NAME	VENDOR PART NO.	TQ	RS	PRICE
001	DIODE, Ref., 9V/7.5 mA, .005%	088-10-09361	Motorola	1N936A/ 1N936B	2	1	
002	DIODE, Voltage Regulator, 13V $\pm$ 5%	088-10-09642	JEDEC	1N964B	2	1	
003	DIODE, Switch, 75V/5UA, 4NS/10MA	088-10-41480	JEDEC	1N4148	16	2	
004	DIODE, Stabistor, .84-1.25V	088-10-48290	JEDEC	1N4829	4	1	
005	DIODE, Ref., 6.2V/7.5 mA	088-97-08230	Motorola	1N823	4	1	
006	INDUCTOR, Assembly	055-89-00001	Ferroxcube	213T050E2A	6	1	
007	INTEGRATED CIRCUIT, Operational Amplifier, 18V	046-34-00004	NSC	LM301AH	2	1	
008	INTEGRATED CIRCUIT, Voltage Follower	046-34-00014	NSC	LM310H	4	1	
009	INTEGRATED CIRCUIT, Current Amplifier, DC to 30 MHz	046-34-00022	NSC	LH0002CH	2	1	
010	INTEGRATED CIRCUIT, Voltage Regulator, Neg. 15V, 1.5A	046-34-00023	NSC	LM320H15	2	1	
011	INTEGRATED CIRCUIT, Operational Amplifier, High-Slew	046-47-00001	Prctsn. Mono.	OP-01CJ	4	1	
012	JACK, Test Point, White	143-98-00006	Sealectro	SKT-8 or SKT-10	5	2	
013	JACK, Test Point, Black	143-98-00010	E.F. Johnson	105-853	2	1	
014	JACK, Test Point, Brown	143-98-00048	E.F. Johnson	105-858	2	1	
015	METER, Edgewise, L Bot., 0 Ctr.	170-99-00045	EMR-T	170-99-00045	2	1	
016	POTENTIOMETER, 500 Ω $\pm$ 30%, 1/2W	201-98-00134	Beckman	62PR500	2	1	
017	POTENTIOMETER, 20 Ω $\pm$ 30%, 1/2W	201-98-00146	Beckman	62PR20	2	1	
018	POTENTIOMETER, 1K $\pm$ 10%, Cermet, 100 ppm	201-98-00272	Beckman	78SBWR1K	2	1	
019	POTENTIOMETER, 500 Ω $\pm$ 10%, .75W	201-98-00273	Beckman	78SBWR500	2	1	
020	RESISTOR, 125 Ω $\pm$ 3%, 3W	626-13-12509	EMR-T	626-13-12509	4	1	
021	TRANSISTOR, NPN, 75V, DC/UHF Amplifier	263-10-22221	Amelco	2N2222A	13	1	
022	TRANSISTOR, PNP, Switch, 60V, HFE	263-10-29071	JEDEC	2N2907A	2	1	
023	TRANSISTOR, NPN, Switch, VCB, 15V	263-10-30100	JEDEC	2N3010	4	1	

Table 6-14 (Cont'd.). EMR 4167-02 Recommended Spares

ITEM NO.	PART DESCRIPTION	EMR STOCK NO.	VENDOR NAME	VENDOR PART NO.	TQ	RS	PRICE
024	TRANSISTOR, PNP, Switch/Amplifier, 50V	263-10-32510	Motorola	2N3251	12	1	
025	TRANSISTOR, NPN, Matched Pair, VBE1-VBE2	263-35-00039	AmpereX	A642/S	2	1	
026	TRANSISTOR, NPN, 15V, Sw., On	263-99-00019	G. E.	2N708	2	1	
027	TRANSISTOR, NPN, 20V, Sw., 350 MHz	263-99-00099	Motorola	2N2501	8	1	

Table 6-15. EMR 4167R Recommended Spares

ITEM NO.	PART DESCRIPTION	EMR STOCK NO.	VENDOR NAME	VENDOR PART NO.	TQ	RS	PRICE
001	DIODE, Ref., 9V/7.5 mA, .005%	088-10-09361	Motorola	IN936A/ IN936B	1	1	
002	DIODE, Voltage Regulator, 13V $\pm$ 5%	088-10-09642	JEDEC	IN964B	1	1	
003	DIODE, Switch, 75V/5UA, 4NS/10MA	088-10-41480	JEDEC	IN4148	11	1	
004	DIODE, Stabistor, .84-1.25V	088-10-48290	JEDEC	IN4829	2	1	
005	DIODE, Ref., 6.2V/7.5 mA	088-97-08230	Motorola	IN823	2	1	
006	INDUCTOR, Assembly	055-89-00001	Ferroxcube	213T050E2A	3	1	
007	INTEGRATED CIRCUIT, Operational Amplifier, 18V	046-34-00004	NSC	LM301AH	1	1	
008	INTEGRATED CIRCUIT, Voltage Follower	046-34-00014	NSC	LM310H	2	1	
009	INTEGRATED CIRCUIT, Current Amplifier, DC to 30 MHz	046-34-00022	NSC	LH0002CH	1	1	
010	INTEGRATED CIRCUIT, Voltage Regulator, Neg. 15V, 1.5A	046-34-00023	NSC	LM320H15	1	1	
011	INTEGRATED CIRCUIT, Operational Amplifier, High-Slew	046-47-00001	Prdsn. Mono.	OP-01CJ	2	1	
012	JACK, Test Point, White	143-98-00006	Sealectro	SKT-8 or SKT-10	3	1	
013	JACK, Test Point, Black	143-98-00010	E.F. Johnson	105-853	1	1	
014	JACK, Test Point, Brown	143-98-00048	E.F. Johnson	105-858	1	1	
015	METER, Edgewise, L Bot., 0 Ctr.	170-99-00045	EMR-T	170-99-00045	1	1	
016	POTENTIOMETER, 500 Ω $\pm$ 30%, 1/2W	201-98-00134	Beckman	62PR500	1	1	
017	POTENTIOMETER, 20 Ω $\pm$ 30%, 1/2W	201-98-00146	Beckman	62PR20	1	1	
018	POTENTIOMETER, 1K $\pm$ 10%, Cermet, 100 ppm	201-98-00272	Beckman	78SBWR1K	1	1	
019	POTENTIOMETER, 500 Ω $\pm$ 10%, .75W	201-98-00273	Beckman	78SBWR500	1	1	
020	RESISTOR, 125 Ω $\pm$ 3%, 3W	626-13-12509	EMR-T	626-13-12509	2	1	
021	TRANSISTOR, NPN, 75V, DC/UHF Amplifier	263-10-22221	Amelco	2N2222A	12	1	
022	TRANSISTOR, PNP, Sw., 60V, HFE	263-10-29071	JEDEC	2N2907A	1	1	
023	TRANSISTOR, NPN, Sw., VCB, 15V	263-10-30100	JEDEC	2N3010	2	1	

Table 6-15 (Cont'd.). EMR 4167R Recommended Spares

ITEM NO.	PART DESCRIPTION	EMR STOCK NO.	VENDOR NAME	VENDOR PART NO.	TQ	RS	PRICE
024	TRANSISTOR, PNP, Switch/Amplifier, 50V	263-10-32510	Motorola	2N3251	6	1	
025	TRANSISTOR, NPN, Matched Pair, VBE1-VBE2	263-35-00039	AmpereX	A642/S	1	1	
026	TRANSISTOR, NPN, 15V, Sw., On	263-99-00019	G.E.	2N708	1	1	
027	TRANSISTOR, NPN, 20V, Sw., 350 MHz	263-99-00099	Motorola	2N2501	4	1	

Table 6-16. Vendor List

ABBREVIATION	VENDOR NAME AND ADDRESS
ALLEN BRAD	Allen-Bradley Co., Milwaukee, Wis.
AMATOM	Amathom Electronic Hdwr. Co., Inc., New Rochelle, N.Y.
AMELCO	Amelco Semiconductors, 1300 Terra Bella, Mountain View, Calif.
AMER SEALANT	American Sealants Co., Hartford, Conn.
AMP	Amp, Inc., Harrisburg, Pa.
AMPEREX	Amperex Electronic Co., Hicksville, N.Y.
AMPHENOL	Amphenol Corp., Los Gatos, Calif.
BECKMAN	Beckman Instruments, Inc., Fullerton, Calif.
C & K COMP.	C & K Components, Inc., Newton, Mass.
DEL BLINN	Delbert Blinn Co., Pomona, Calif.
DOW CORNING	Dow Corning Corp., Midland, Michigan
E.F. JOHNSON	E.F. Johnson Co., Waseca, Minn.
EMR	EMR-Telemetry, Div. of Weston Instruments, Inc., P.O. Box 3041, Sarasota, Fla. 33578
ERIE	Erie Technological Products, Inc., Erie, Pa.
FERROXCUBE	Ferroxcube Corp. of America, Saugerties, Calif.
G.E.	General Electric Co., Miniature Lamp Dept., Cleveland, Ohio
GRAYHILL	Grayhill, Inc., La Orange, Ill.
GUDEBROD	Gudebrod Brothers Silk Co., Inc., 12 S. Twelfth St., Philadelphia, Pa.
IERC	International Electronic Research Corp., Burbank, Calif.
JEDEC	Any Qualified Vendor

Table 6-16 (Cont'd.). Vendor List

ABBREVIATION	VENDOR NAME AND ADDRESS
MILTON ROSS	Milton Ross Metals Co., Southampton, Pa.
MML (NO.)	EMR-Telemetry Multiple Manufacturers List. See Table 6-17 for manufacturer's name and part number. (Parts may be ordered from EMR-Telemetry, Div. of Weston Instruments, Inc., Sarasota, Florida, using the 10-digit number in the EMR NUMBER column of the parts lists.)
MOTOROLA	Motorola Semiconductor Products, Inc., Phoenix, Ariz.
NAT SEMI	National Semiconductor Corp., Santa Clara, Calif.
NSC	National Semiconductor Corp., Santa Clara, Calif.
PRCSN MONO	Precision Monolithics, Inc., 1500 Space Park Dr., Santa Clara, Calif. 95050
QVL	Qualified Vendor List
RAYCHEM	Raychem Corp., 300 Constitution Dr., Menlo Park, Calif.
SEAELECTRO	Seaelectro Corp., Mamaroneck, N.Y.
SEASTROM	Seastrom Mfg. Co., Glendale, Calif.
WAKEFIELD	Wakefield Engineering, Inc., Wakefield, Mass.
ZIERICK	Zierick Mfg. Corp., Radio Circle, Mount Kisco, N.Y.

Table 6-17. Multiple Manufacturers List

MML NUMBER	VENDOR NAME AND ADDRESS
MML 2	Motorola Semiconductor Products, Inc., Phoenix, Ariz. (or equivalent)
MML 4 Part No. 2N2222A Part No. 2N3251	Amelco Semiconductors, 1300 Terra Bella, Mountain View, Calif. (or equivalent) Motorola Semiconductor Products, Inc., Phoenix, Ariz. (or equivalent)
MML 16	Sealectro Corp., Mamaroneck, N.Y. (or equivalent)
MML 40	National Semiconductor Corp., Santa Clara, Calif. (or equivalent)
MML 48	Erie Technological Products, Inc., Erie, Pa. (or equivalent)

Table 6-18. Customer Provisioning Questionnaire

1. Equipment to be spared
 Model No. (s): _____
 Serial No. (s): _____
2. Number of equipments to be spared in each location _____
3. Operating time and cycle: _____ hours/day, _____ days/
 week.
4. Operating Environment:
 A. Temperature: _____
 B. Humidity: _____
 C. Altitude: _____
 D. Shock and Vibration: _____
5. Non-operating Environment: _____
 A. Temperature: _____
 B. Humidity: _____
 C. Altitude: _____
6. Desired probability of being able to spare from complement
 _____ percent for _____ months.
7. Can usage permit troubleshooting to parts level when a
 failure occurs? _____
8. What spare assemblies do you have that are used in this
 Model Equipment? _____
9. Do you wish us to exclude the EMR warranty period? _____

TECHNICAL MANUAL UTILITY REPORT

At EMR, we continuously strive to produce high quality and usable technical manuals for our equipment. To help us in this regard, we request that after reading and using this manual, you record your comments and suggestions on this utility report and return it to EMR. When completed, remove this page from manual, fold on dotted lines, staple, and mail. Insert additional sheets if necessary.

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